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MOTOR AGE

Vol. XLII
Number 6

PUBLISHED WEEKLY AT THE MALLERS BUILDING
CHICAGO, AUGUST 10, 1922

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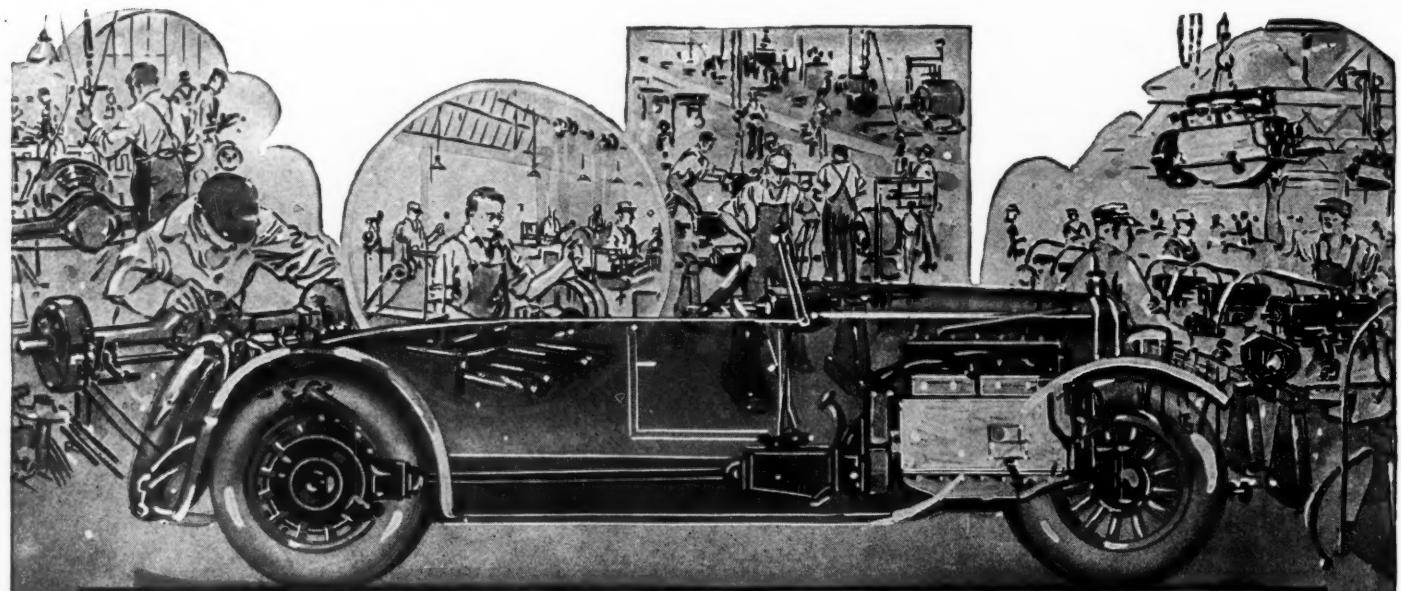
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Motor Manufacturers
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Continental Motors



MOTOR AGE

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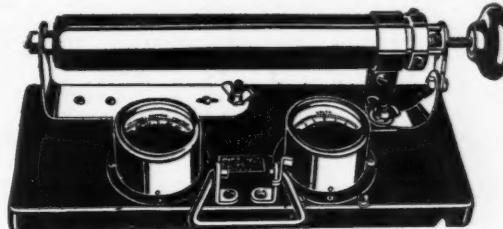
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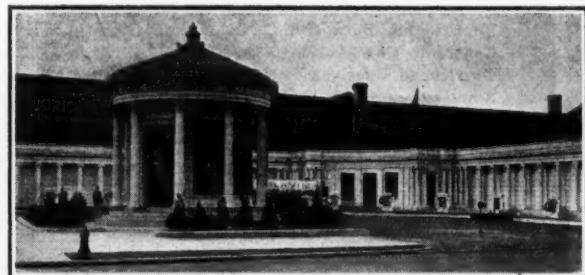
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MOTOR AGE



Cooperation as a Builder of Sales and Permanency

A Constructive Policy Which Costs Little But Means Much to the Man Who Has a Wholesome Belief in His Business

By CLYDE JENNINGS

THE dealer who puts on a selling campaign is going to get very much in earnest about selling and after he has had a fling at it, he is going to wonder what he must do to make his business a permanent, dignified success. At the recent meeting of the Advertising Managers of the National Automobile Chamber of Commerce manufacturers, S. S. Swiss of the Republic truck expressed a very good thought. It was about like this:

The automotive industry will never be properly represented in the dealer field until men are selected as dealers who will have the ideal of building a regular mercantile business that they can leave to their sons and their grandsons. Dealers must look 20 or 40 years hence, not to next fall.

The injection of this ideal into the 60,000 or more men who are at present the heads of automotive dealer establishments—by this is meant car, truck, tractor, accessory and maintenance



dealers—would immediately solve most of the dealer problems. The man with an ambition of this sort will make only honest mistakes, and these can be forgiven if he has enough ability to profit by these mistakes.

There are many such men now at the head of automotive dealer establishments but 60,000 honest and fearless men is a very large number to recruit hurriedly. You remember the story of Diogenes, but the world has grown better since then and business ideals are advancing very rapidly, so the hope of recruiting a large body of honest fearless men is not by any means a hopeless one.

There are good merchants in the automotive business as in any other business but there are not enough of them. Time will solve that and we may look in the future for a higher percentage of this sort of men in the automotive dealer business than in any other line, because it is a fine, clean, honest business and will attract fine, clean honest men. And only this sort of men will survive. Some of the others will prosper for a time, but as certain as the automotive business goes on, the crooks will fall by the wayside.

There is another hopeful feature of the automotive business. Its merchandise is well known and appreciated and the junk car is quickly recognized and goes its way. All of this merchandise is of sufficient importance to be branded. It cannot be bought in the open marked by any Tom, Dick and Harry. The dealer really assumes much of the role of an agent, in that he must buy his merchandise from certain definite sources, rather than from any jobber, as is the case in many lines of small merchandise.

So we can confidently look forward to rapid advances in the quality of the merchant ability within the automotive industry. It is more than strange that more merchants who have been successful in other lines have not been attracted to automotive lines. It is the cleanest mercantile business of today and it has the advantage of fewer annoying details, less credit losses than the others and it is the equal of any other line in profit and essentiality.

There is one feature in which the automotive dealer has been backward and that is in co-operation. Co-operation means much in the business world today. It enters into the mercantile in as many disguises as the popular composer presents his jazz dance discords. Here are only a few of the profitable points for co-operation for the automotive merchant:

With his factory.

With truck and tractor dealers of his community.

With fellow merchants of his home community, county, state and nation.

With the men who have law making influence.

With home town business organizations.

With city and county officials.

With motor clubs.

With his customers.

With the factory.

This sounds like foolish and unnecessary advice, but when you talk with dealers, factory sales and service managers, to say nothing of executives of distributors, you learn that there are some dealers who will not even answer letters.

Every dealer should keep uppermost in his mind that he and the factory officials are of one accord on the big idea—both want to sell as many cars as possible. There may be some difference of opinion as to how this can be done, and it is entirely probable that neither the dealer nor the factory has the best of all ideas, but any sales idea will fail unless all work together for the common end.

Recently a factory sales manager conceived the idea of helping his dealers with some special advertising material to be mailed directly to the prospect from the factory sales office. He thought it was a big thing, and results have shown that he was right in his idea that his literature would help sales.

This man wanted each of his dealers to send him 10 names of prospects for the tryout of this experiment. Naturally one would think that return mail would bring these names but what do you think happened. In letter No. 4 on this subject the sales manager was still asking, almost with tears in his eyes, for these 10 names. Here is an extract from his letter:

"We have written you at least four times, asking you in each instance to get in here to us a list of your retail prospects to receive this Summer Direct to the Buyer Campaign.

"The preparing of such a list is only a very small job. It would take less than fifteen minutes and certainly very little physical effort and that is just the reason why we simply cannot appreciate at all, why we so far have not had any response from you.

"If you wrote in here for literature, signs, photographs, etc., you would feel very much hurt if we simply paid no attention to your request. But is this the kind of co-operation you get from the factory?—Not on your life.—If you write in here for anything, you either get it, or a mighty good explanation why not.

"We know that you do not assume an indifferent attitude toward this campaign. It is too fine a campaign. Neither do we feel that it is a lack of co-operation. It is, in our opinion, simply neglect."

Co-operation too often means that the other fellow should do as you want him to do. That is not co-operation at all. Co-operation is working out a middle path where all concerned can act in accord. Co-operation is merely team work. You may not agree with the sales manager that a direct to the buyer campaign is the best thing, but certainly it will do no harm and it might make a sale for you. A sale of an automobile always carries enough profit to be worth considering and worth getting all the help you can.

Don't stand around picking flaws with the factory and looking between the lines of all the letters for things to fuss about. Give the factory the benefit of the doubt and then work as hard as you can to sell cars.

Remember that the people at the factory have more at stake than you have.

Remember, too, that factory officials are only human and that they probably do as many foolish things as the dealer, so neither should get very high and mighty over a mistake by the other.

Just keep in mind at all times that all concerned with the Runwell car should be working with one object in view—to make it the best liked car in the country now, tomorrow and for ever. This cannot be accomplished unless there is co-



operation—which means give and take—all along the line from the factory head, down through the engineering, production, sales, service, distributor, dealer and grease hound. If you do not like the car, or you cannot believe in any one higher up to the point that it creates a distrust in your product, get out of the line and join some other training squad that holds your confidence.

Dealer should co-operate with car, truck and tractor dealers of his community.

All dealers in a given community have a common interest that is of great importance to their own business. In many cases the automotive interests are on the defensive in a community. This industry being a new one, and in many cases not understood, it is subject to many unfair attacks which one man standing alone cannot answer. Again, the industry is asked to enter into certain movements that should not be supported, at least in the way in which they are suggested.

A type of the attacks on this industry has been that of the bankers, which is happily growing less and less. Only a few years ago most bankers regarded the entire list of automotive vehicles as luxurious. Now the bankers are conceding that the automotive vehicle, including the tractor, are economic if not necessary and this campaign must be carried on until the banker admits of the necessity. Few bankers, and few other business men including the automotive dealers themselves,



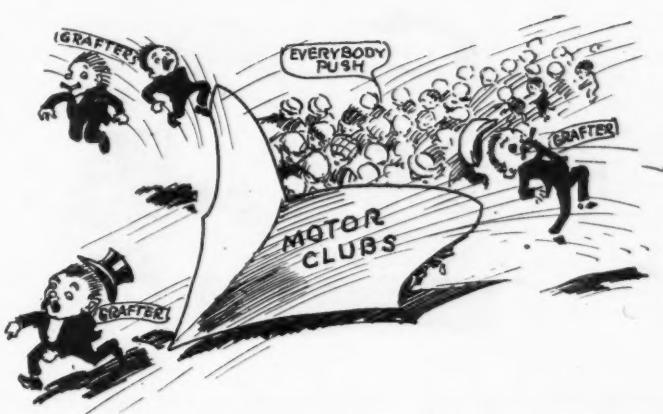
have any conception of the importance of the automotive industry to their own community.

The co-operation of the dealers in a community should begin by the formation of an association for the advancement of the automotive interests of the community. Once this association is formed, the dealers of that community can begin by raising the standards of business of their own membership. This in itself will be worth while. Clean up the maintenance and tire shops. Put maintenance in that community on a reliable basis. Tell the truth about the man who will not adopt the better standard of business.

Once you have this association working and your own standards pretty well in hand begin an aggressive fight for the advancement of the automotive interests in the community. The Quincy, Ill., Association early this year entertained all of the bankers of that community at a dinner at which the importance of the automotive interest was pointed out and proven by carefully gathered figures. This community, although it has no large automotive manufacturing interests, made a very impressive showing. The statement prepared for that occasion was printed in MOTOR AGE of April 6.

Recently the Oregon State Association has done a similar work for that State. The results of this showing of the industry in that state is surprising and was printed in MOTOR AGE Aug. 3.

The ramifications of this aggressive work are so many that they cannot all be enumerated here. It reaches out into many lines, especially in bringing the local automotive interests to the support of certain highway movements in a unit. Also it should bring condemnation of certain other highway move-



ments—such as the organization of a highway body that is planned solely for political purposes or to supply some press agent with a job.

The local representatives of the automotive industry should be the leaders in every community in this country. The automotive industry is very near the top in the industrial world, the vehicles in the hands of the people are one of the heaviest of local investments, and the local representatives should take their proper place in the community as the worthy representatives of such an industry.

Dealer should co-operate with fellow merchants of home community, county, state and nation.

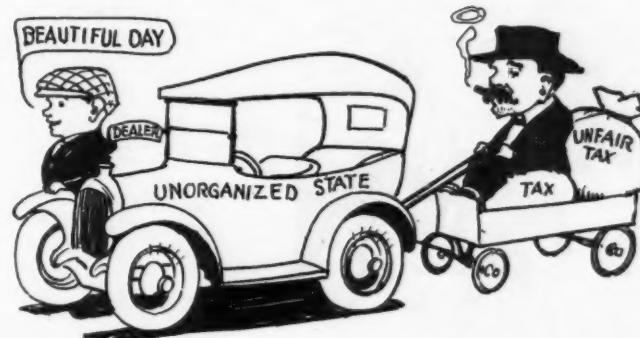
The first section of this statement has been covered, so we will start from there.

Once the local association is organized, local merchants should seek to extend their influence for good. The automotive customer is likely to consider a dealer 15 miles from his home or garage as quite handy. It will do little good to elevate the standard of merchandising in one community, unless you take care of the nearby communities. The ambition, of course, must be to place the entire dealer interests of the country on a high plane.

After the home community, the county comes next. It is a political organization and many movements are county wide. Road programs are often for the county and the automotive interests should have much to say about such programs. County police often have much to say about traffic. More automotive vital interest. County officers can have much to say about taxes and business generally.

Then comes the state. The state interest is a very heavy one for every automotive dealer. It is the state that is moving to tax gasoline sales, to license your mechanics to license all drivers and especially dealer drivers, it is the state that is threatening to raise truck (and sometimes car) licenses so high that a lot of people would have to sell their cars.

The state tax hunter is the hungriest of all tax hogs and he is always eyeing the automotive industry. The way to meet him is through a state association that is active, well equipped, that knows the extent of the business in the State, knows how many voters the industry supports and knows many of the legislators. A state association can do wonders in a fair fight, for most legislators are fair. But without a state spokesman,





the automotive dealer is going to lose a lot of sales because of excessive taxes and he is going to pay a lot of taxes on his own merchandise and help.

Then comes the national association.

The national field of activity is a large one and an important one. It must represent the dealers of this country before the high legislative bodies and the various bureaus at Washington. The value of such an organization has been proven time and time again. It is being proven here today, as the readers of automotive business papers know. Recently the National Automotive Dealers' Association undertook a new venture for this field, and that was requiring the member to qualify and to subscribe to a code of trade ethics. This movement also is familiar to readers of MOTOR AGE and is proving popular with the leading dealers of the country.

The association movement developed early in the history of the automotive business and a good argument against it has not yet been produced. It is only in case of members failing to take themselves and their association work seriously that it has failed.

Dealer should co-operate with home town business organizations.

What has been said applies only to co-operation with automotive merchants. The automotive dealer will, however, find it profitable to co-operate with all sorts of merchants. When the merchants of his community put on a sales day, he should have bargains on display and should join them in advertising this trade winning. Too often the automotive dealer is not accorded a merchant, just why we cannot tell but he appears often to be put in a class by himself. That is unfortunate.

The automotive dealer also should be identified with the local merchants association, with the Rotary, Lions and other clubs of this sort. All of these have a purpose and most often the purpose is a good one and distinct progress is made. By all means the automotive merchant should be identified with the chamber of commerce, or whatever the promotion organization is called.

Dealer should co-operate with men who have law-making influence with city and county officials.

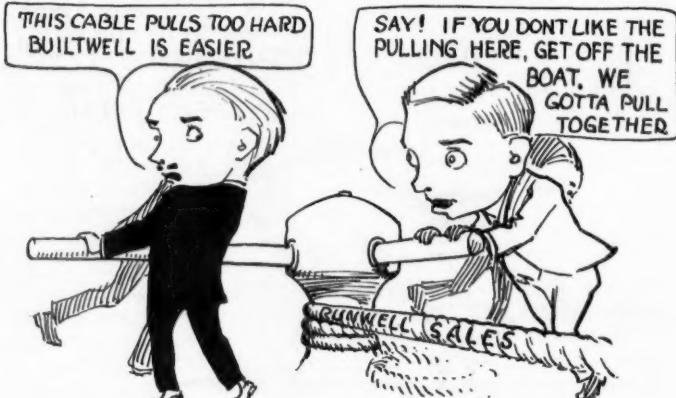
To an extent this subject has been covered in the notes regarding association work but the dealer who has a social and business position worthy of his business in his community, also

meets the various officials in a social or business way. The officials frequently have great power and influence in the preparation of bills that are to become laws and they are the first persons consulted when some action looking toward the regulation of traffic or the increase of taxes are contemplated.

We will grant that officials as a rule are honest and their efforts that to the automotive expert appear to be so misguided, are due to ignorance rather than to any intent to be harmful to the motorist or to those men who are in the automotive business. Frequently the projects that work to the detriment of the automotive vehicle get so far along in private conferences that when the association hears of them, the officials cannot back water on them. They are a part of the general scheme and must be supported even if they work an injustice.

The way to remedy this situation is for the dealer to pay some attention to the automotive education of his official friends. These men will be glad to learn more about the automobile, its operation, the people who own them and especially the business interest behind them. The story of the automotive industry is a business romance that will interest and thrill every red-blooded business man and will win his admiration. It will make him a friend, instead of an enemy.

It is in this way—by talking business to business people—that the automotive dealer can make for better conditions for himself and his customers. Every man has a personal influence and it is only good business for him to use this influence to build a respect for himself and his business.



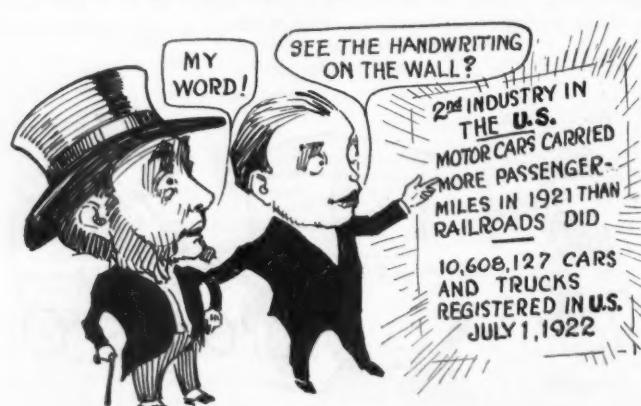
Dealer should co-operate with Motor Clubs.

The motor club is a great power for good or evil, according to the understanding and intentions of its officers. Some motor clubs have been extremely beneficial to the automotive industry and for social, political and business reasons, automotive dealers should encourage the organization and extension of such clubs and they should also aid in the organization of such clubs into state and later into a single national organization. At the time of this writing there are two "national" organizations. Such a state of affairs is unreasonable and must be ended by the survival of the fittest. Two such organizations will serve only for confusion in national affairs.

The motor owner, properly organized, will be the most powerful educative institution in this country. It will comprise several million persons, owners of tangible property and consequently taxpayers, with common objectives. These objectives will have to do with better traffic conditions, good highways and the honest building and maintenance of the same, better drivers and generally better conditions of highway transportation.

Such clubs already have done much good for the industry. They have been powerful in obtaining higher class legislation from city, state and national law makers. They have been a power for honest law enforcement and in many communities have routed the grafters who preyed upon motorists. They have been instrumental in establishing parking places and camps. They have been generally useful in promoting the social and business use of automotive vehicles.

Usually the best men and women in a community are available for club leaders. Some of the best clubs are those in



which dealers are active. Dealers who are willing to place purely selfish interests behind a greater service to owners for all owners make ideal directors for such clubs. Dealers should not only be active in such clubs but should advise buyers of cars to join them.

There are other clubs, usually short lived, which are organized by grafters and by unworthy dealers who seek only to attract customers for their equipment. Dealers should openly fight these clubs and should positively advise their customers not to join them. Mulcting the car owner is a popular sport and each time a car owner pays something for nothing, he is likely to blame the car.

Dealer should co-operate with his customers.

This suggestion appears to be so very obvious that there should be nothing to say, but some dealers have not fully gotten the idea. Probably the suggestion would be better made in this form: "Dealers should co-operate with motor vehicle owners." The idea behind this changed form of the suggestion, is this:

Every motor vehicle owner is a splendid prospect for the sale of another vehicle or for several more. If the dealer who sold the vehicle he now owns does not co-operate with this owner, he is going to be dissatisfied and another dealer by showing a broad and unselfish spirit can pick him up and put him on his prospect list. The motor vehicle owner needs

help and advice. He does not know all about his vehicle, and if he did know all about it he could not do all the work that will be required. He has not the tools nor the skill to do it.

So when a motor vehicle owner asks you for advice, give it to him honestly and in the broadest spirit of service. Above all, keep him sold on the automotive vehicle and do not take the attitude that if he is the owner of a competitive car that you should disgust him with this car. A knocker not only hurts the industry, but he hurts his own business.

Say it was possible that this man had bought a poorly made car (which is not likely today) the dealer will gain nothing by telling this man that he has been bunked and disgusting him with cars generally and making him suspicious of all dealers, but his course should be to put this car in the best condition possible, explain exactly what is the matter and above all, keep the owner sold on the industry in general.

There is so much to be said on this subject that it will be taken up in later divisions of this treatment of the dealer problems under many heads, especially maintenance. Something already has been said about legislative work, about clubs and similar work of dealer co-operation with owners. This topic is probably the most important of all suggestions that can be made regarding deeper prosperity.

Fortunately the old type of dealer who believed that he was in business only to sell a car to any man who had the money and then forgot him is disappearing.

What Became of the War Department's Cars and Trucks?

Table Showing How Surplus War Material Was Distributed to the Highway Departments of the Various States

ANY concerns and individuals have been interested to learn what finally became of the passenger cars and trucks which were turned over to the Agricultural Department by the War Department for delivery to the various State highway departments, following the war. The answer to this question is given in the appended table, which shows the number of cars and trucks delivered to each State. The materials delivered to the various States included, in addition to the automotive equipment, hardware, a few rolling machines, numerous concrete mixers and a few rock crushers.

The total number of each make of truck and car delivered is as follows: International, 432; Gramm-Bernstein, 128; Nash, 7,155; Heavy Aviation, 1,353; Federal, 455; Pierce-Arrow, 1,900; Velie, 277; Light Aviation, 600; Hurlburt, 122; Packard, 2,299; White, 585; Peerless, 682; F. W. D., 3,067; Wilson, 76; Standard, 307; Standard Class B, 2,508; Garford, 179; Kelly-Springfield, 972; Republic, 190; Mack, 102; Denby, 103; G. M. C., 406; Commerce, 72; Moreland, 164; Selden, 129; Riker, 291; Miscellaneous, 198; Ford, 2,739; Dodge, 1,118; Miscellaneous, 716.

The number of cars delivered is as follows:

State	Per Cent	Estimated		
		Total Cost	Total Number of Material	Total Number of Trucks
Alabama	2.12	\$2,253,057	430	104
Arizona	1.44	2,436,823	326	30
Arkansas	1.72	2,376,257	372	76
California	3.37	4,463,012	775	133
Colorado	1.83	3,189,530	487	60
Connecticut	0.66	776,426	151	26
Delaware	0.50	419,263	45	14
Florida	1.21	2,126,165	287	73
Georgia	2.73	4,244,778	630	139
Idaho	1.28	1,563,328	298	37
Illinois	4.44	6,314,468	1,006	188
Indiana	2.68	5,067,439	677	125
Iowa	2.88	3,627,527	738	126
Kansas	2.87	3,819,984	727	99
Kentucky	1.94	2,415,469	475	101
Louisiana	1.36	2,001,044	343	59

State	Per Cent	Estimated		
		Total Cost of Material Delivered	Total Number of Trucks	Total Number of Cars
Maine	0.95	1,129,080	200	42
Maryland	0.88	1,674,163	271	40
Massachusetts	1.50	1,286,304	207	76
Michigan	3.08	6,033,424	786	140
Minnesota	2.90	3,384,433	621	97
Mississippi	1.77	2,994,715	422	86
Missouri	3.35	4,448,381	919	115
Montana	2.12	2,291,787	408	64
Nebraska	2.16	3,210,623	456	86
Nevada	1.30	1,314,817	249	32
New Hampshire	0.50	532,853	122	17
New Jersey	1.29	2,128,139	369	98
New Mexico	1.63	2,148,374	369	50
New York	5.05	\$7,874,065	1,384	195
North Carolina	2.34	3,777,655	737	114
North Dakota	1.59	1,621,603	344	49
Ohio	3.86	5,372,866	1,000	176
Oklahoma	2.40	2,692,467	548	80
Oregon	1.62	2,058,265	363	47
Pennsylvania	4.65	4,528,909	834	167
Rhode Island	0.50	336,770	61	17
South Carolina	1.45	1,964,464	355	58
South Dakota	1.65	2,904,169	431	69
Tennessee	2.25	3,938,101	538	116
Texas	6.05	7,855,378	1,365	205
Utah	1.16	1,439,278	274	23
Vermont	0.50	748,818	126	23
Virginia	1.99	3,270,903	454	103
Washington	1.51	1,478,738	316	44
West Virginia	1.10	3,251,135	370	37
Wisconsin	2.59	3,735,374	604	153
Wyoming	1.28	1,133,277	236	28
		100.00	\$139,752,988	23,506
				4,037
Retained by Dept. of Agriculture		10,473,750	1,246	536
				4,573
		**\$150,226,738	24,752	

*The value of the materials above listed is exclusive of the material delivered to the states from the surplus at Camp Grant, Rockford, Ill.

New Models and Innovations Recently Introduced

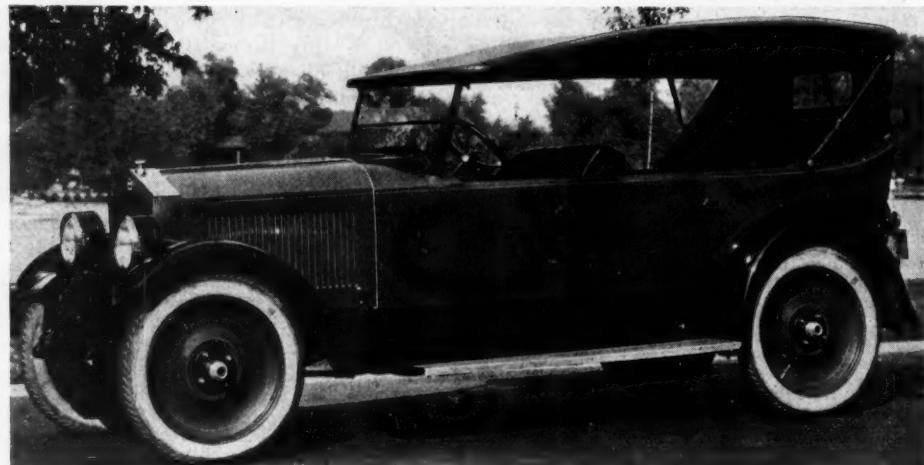
New Moon Seven Passenger is Larger Car

Moon has just announced a new seven-passenger car known as the model 6-58, which is practically a continuation of the model 6-48 excepting that it is a much larger car. The engine is the new type Continental and such units as Timken axles, Borg & Beck clutch, Delco electric system, Brown-Lipe gearset, etc., are continued. The price of the 6-58 is \$1,785 f. o. b. factory.

The company was especially anxious to get plenty of room in this car and in doing so did not sacrifice the low and rakish lines of the former models. The auxiliary seats are so arranged that the passenger has plenty of leg room. The windshield has been designed by Moon and the company feels it has what might be termed a really water tight and non-rattling windshield. The lower half is stationary and the upper half made to tilt.

There are some rather novel features in the new car among them the ball and socket mounted headlamps, which easily can be shifted to any angle. The lamps are snare drum type with silvered rims. The instrument board is ebony finished and the faces of the instruments are made in a satin silver finish. The upholstery is tan, Spanish leather, French plaited and air ventilated.

The mechanical features include the Red Seal Moon Continental engine with $3\frac{1}{2}$ by $4\frac{1}{2}$ in. bore and stroke, which has in unit with it the gearset, the latter being equipped with the Johnson lock. The universal joints and drive tube are Spicer, of large diameter to eliminate whipping at high speeds. The frame is



Above; The new 6-58 model, seven-passenger Moon, similar to the 6-48, but larger.

Right: View of Cowl of the new Moon, showing the arrangement of instruments on the dashboard.



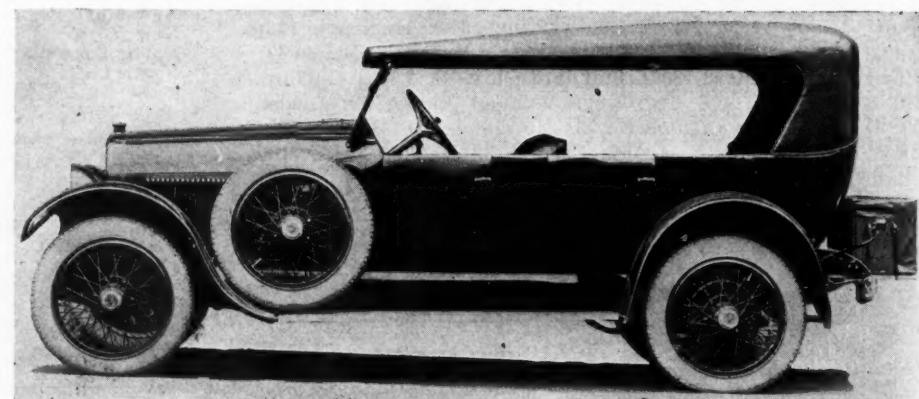
of new design and is 7 in. deep. It is strengthened front and rear by tubular cross members and has a steel deck at the rear to stiffen it and also act as a protector to the fuel tank. There are four other cross members. The frame is carried on semi-elliptic springs, the sizes of the front and rears being 39 by 2 in. and 55 by 2 in. respectively. All the spring eyes are bronze bushed.

The steering gear is Gemmer, with an 18 in. wheel. The spider is aluminum and the control levers are nickel. The standard equipment includes a robe rail, complete kit of tools carried in front door, curtains to match top, motor-driven horn, etc. The weight of the car is 3,100 lbs. The wheelbase is 128 in.

Permanent Type Top On New Westcott

A TOP of the California type with a rigid frame is a distinguishing feature of the new model Westcott, known as the larger six. It is the first phaeton with a permanent top as standard equipment.

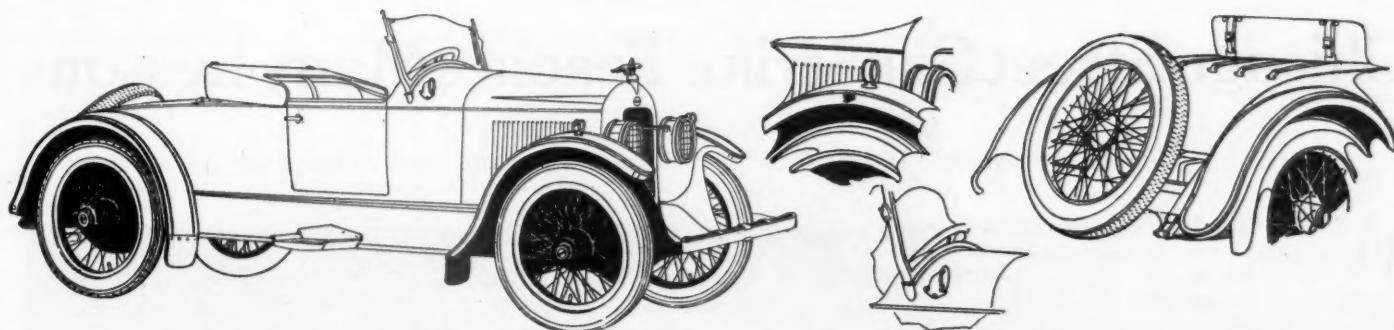
It is a seven-passenger car mounted on a 125 in. wheelbase. The equipment is particularly complete, including storm curtains designed to fit the Westcott permanent top. There is a cowl ventilator controlled by a rod on the instrument board. For \$100 additional, a rigid frame plate glass window enclosure is provided which is designed to give practically a closed car appearance and weather protection. One of the features claimed for the new model is the particularly complete finish, seventeen coats hand rubbed



with a semi-baked finish being employed.

The units employed in the Westcott Larger Six chassis include the Continental type 12-X six-cylinder engine, $3\frac{1}{2}$ by $5\frac{1}{4}$ in. bore and stroke. The radiator is Fedders; ignition and other electrical equipment, Delco; battery, Willard, 12

amp. hr. capacity; carburetor, Rayfield; axles, Timken; steering gear, Gemmer and the chassis is provided with the pressure gun system. The price of the new car is \$1,990. The price of the regular touring car without the permanent top feature is \$1,890 and of the sedan, \$2,890



Earl Custom Roadster

The Earl Motors, Inc., has brought out a new custom roadster, which is being offered at \$1485, with three choices of paint and upholstery. The custom roadster is mounted on the standard Earl chassis and has an overall length of 13 ft. 11 in. Ready for the road, the car weighs 2460 lb. Some of the dimensions of the new roadster are as follows:

The driving compartment is 56 in. long; the width of the seat is 42 in., the depth is 18½ in. above the floor board.

From the seat cushion to the steering wheel is 8 in., from the back cushion 15 in. The side rails are 10 in. above the seat. Luggage space in back is 20 cu. ft., giving room for golf bag and week-end kit. It is accessible by tilting the back of the seat forward.

The colors offered are horizon blue with contrasting blue and back striping, mustard with blue striping and grey with blue striping and black wire or disk wheels.

The seat cushions, door and body

panels are genuine leather harmonizing with the body paint. Radiator, lamps, marine type ventilators on the cowl, windshield frame and standard and light finish fittings are of polished nickel. The individual steps are of polished aluminum with rubber inserts; the instrument board and steering board black walnut. An interesting feature is the left hand ignition and dimmer switch to facilitate night driving on the main traveled roads. Wire or disk wheels with cord tires are regular equipment.

BLACK & DECKER ELECTRIC GRINDER

A bench grinder especially intended for automotive repair shops and fitted with two 8-in. grinding wheels, two wheel gaards, two adjustable tool rests, toggle switch in base and 5 ft. of duplex electric cable and attachment plug has been announced by Black & Decker. The grinding wheels have a 3-4 in. face and the load speed of the machine is 3,600 r. p. m. Its net weight is 75 lbs. The motor is not universal and consequently it is necessary to specify the available current and also the cycle. The motor is $\frac{1}{2}$ hp. and has the grinding wheels mounted directly on its shaft. The price for 110 and 220 volt machines is \$90 and \$94 respectively. A pedestal can be furnished for \$18 additional.

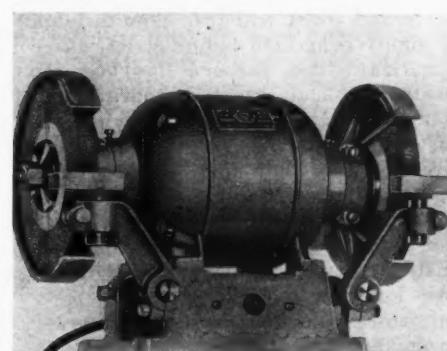


Anderson Brings Out a Light Aluminum Six

The Anderson Motor Co., Rock Hill, N. C., is bringing out a new Light Aluminum Six, the five passenger phaeton model of which is to sell at \$1195. The price on the Series 40 phaeton model is \$1650. An enclosed model will be put out later at a price that will be very little in advance of the phaeton model. The new model is shorter than the old one, having a 114 in. wheelbase. The engine is Continental, Model 6-Y. Other standard parts are Borg & Beck clutch, Salisbury front and rear axles and Westinghouse starting, lighting and ignition system.

The springs are semi-elliptic and are 37 in. in front and 57 in. in rear with

tapered leaves. The tires are 32x4 cord and the weight of the phaeton model fully equipped is 2,450 lb. The construction of the cowl and hood brings the body forward 4 in. which really gives the equivalent of a 118 in. wheelbase in actual body length. The top is clear vision with gipsy side curtains, upholstery is genuine leather. The headlights are drum type and a Moto-Meter and Allemite system are part of the standard equipment. The car takes its name from the fact that the body is covered with aluminum on a framework of ash. The previous line of Anderson models known as the Series 40 is to be continued along with the Light Aluminum Six.



U. S. Leads World in Automotive Exports

The United States leads the world in the export of motor cars and motor trucks. Forty per cent of 1921 automobile exports came directly from factories in the U. S. A. Ten per cent more were exported from U. S. branches in Canada, and the bulk of the 25 per cent exports from France were re-exported U. S. war vehicles. Nine per cent of this business was done by Italy, 7 per cent by Germany, and 4 per cent by England.

Chicago Street Car Strike Teaches Many Lessons

How the Automobile Dealer Was Affected and What the Automobile Did

WHEN electric street and elevated railways in Chicago suspended operation on Aug. 1, because of a strike of employees, there followed for six days probably as severe a test of motor vehicle transportation as could be found anywhere in America and the automotive industry was afforded an unusual opportunity to observe the effects of such a strike and to learn lessons that should be of value to the industry and to automobile owners everywhere.

Most surprising to traffic experts, to officials of the electric lines, to the strikers and to the general public was the promptness with which motor vehicles became the chief means of conveying workers between their homes and places of employment. Motor vehicles accomplished this task so completely that on the second day of the strike there was scarcely an employe absent from any of the stores, offices or factories because of lack of transportation.

Only a little less surprising was the fact that there was no immediate stimulation of automobile sales, but rather a depression of this business in the early days of the strike, revealing that no material increase in the available supply of motor vehicles was necessary to meet the immediate transportation requirements.

Maintenance and sales of supplies and accessories increased immediately and indications were that they would grow progressively with the continuation of the strike.

A lesson of value to the industry was brought sharply to the front by the ease with which special traffic regulations enabled the extraordinary volume of automobile and truck traffic to flow through the highly congested loop district where in normal times passage has been so slow and difficult as to discourage and deter the ownership of cars by persons who do not want a car unless they can drive it where they want to go with a fair degree of satisfaction.

The mustering of motor vehicles to meet the emergency was gone about systematically and was made easier by advance knowledge of the strike. Department stores, manufacturers, mail order houses and other large employers already owned large fleets of trucks and these were used morning and evening for the transportation of employes over routes laid out in systematic manner. Cars owned privately by officials and employes of these concerns also were used, the owner usually arranging to carry a number of fellow workers whose homes were in the general neighborhood of his own.

Thrifty owners of passenger cars and trucks immediately began the transportation of passengers for hire, this being



One-way traffic found its way into Chicago during the strike of the traction operators and it showed the city officials that such a system of handling traffic is a really practicable one. A go and stop signal was put up on a corner building in full view of everyone. It, too, owes its existence to the car strike.



The Fire Department also helped to transport workers to and from their work. The powerful craft amply illustrated what the motor vehicle can do, not only "in emergency," but at all times, if necessary. Busses and automobiles will be used with greater confidence by Chicago's citizens and fathers after this.

permitted without license in the emergency. Many such vehicles ran over regular routes at rates fixed by competition. The usual rate per passenger from Sixty-third street to downtown, a distance of about eight miles, was 25 cents. There was some doubt as to the profitability of this business, especially for passenger cars with limited capacity. The number of improvised busses and taxicabs in the business was such that profiteering was impossible and the regular taxicab business suffered to a considerable extent.

The head of the elevated electric lines, apparently alarmed at the ease with which the city was getting along without the service of his lines, issued a public statement saying that it would be impossible for the available motor vehicles to carry any substantial proportion of the 560,000 passengers transported daily over the elevated lines. This, he said, took no account of some 2,000,000 passengers carried daily by the surface cars. He undoubtedly placed the figures of passengers carried too high, counting transfers as additional passengers and failing to take into account the short trips which might be walked without great inconvenience. The absurdity of his statement was so apparent that it was given little attention by the press or the public.

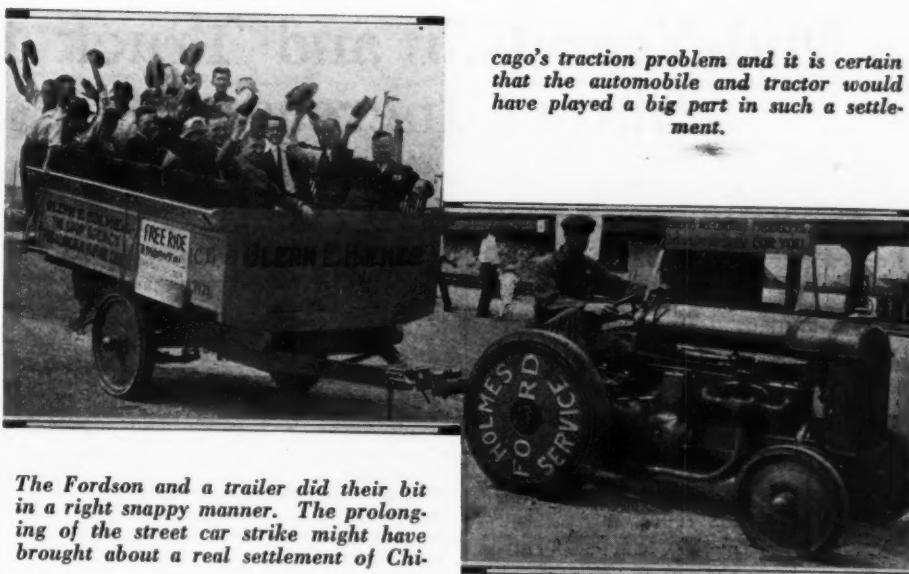
The willingness of persons driving their own cars to carry friends or strangers to the capacity of the car was a notable aid. The motor clubs and the Chicago Automobile Trade Association issued letters to dealers and owners urging this practice, which was generally followed.

Assistance was given by the steam railroads, all of which increased their suburban and local service, but the great bulk of the transportation problem within the city limits was taken care of by motor vehicles. The approximate number of motor vehicles available in the city was 200,000 and virtually all of these were in use.

A visit to a number of dealers' sales rooms after the strike had been in progress a few days revealed that there had been no increased demand for motor cars. It was learned that a few sales of light trucks were traceable directly to the strike but, on the other hand, some dealers in both new and used cars reported that there were fewer inquiries by prospective purchasers than in normal times. A number of dealers made special advertising efforts to sell used cars, but the results were not up to expectation.

The car owner considering the purchase of a new car appeared to be unwilling to make the purchase in a time of unsettled business and traffic conditions but rather preferred to drive the old car during the strike. The person considering the purchase of a car for the first time was in most cases discouraged rather than encouraged by the strike because of his unwillingness to undertake to drive a new car under abnormal traffic conditions.

The business depression incident to the



The Fordson and a trailer did their bit in a right snappy manner. The prolonging of the street car strike might have brought about a real settlement of Chi-

strike also had a deterring effect on automobile sales. Although workers were able to get to their places of employment, there was a decided decrease in the number of shoppers visiting the downtown and other retail sections. Small tradesmen in scattered sections received some of the trade that normally would have gone to the centers, but by no means all of it. The net result was a local business slump of sufficient magnitude to cause some uneasiness to all persons depending for a livelihood on the city's commerce.

The greater use of motor vehicles naturally meant greater volume of business for maintenance shops and dealers in supplies and accessories. At the time this was written the strike had not been in progress long enough for the maintenance to reach the maximum volume expected by observers familiar with the conditions of continuous operation imposed upon most cars and trucks.

The increase in the use of motor vehicles was shown strikingly by the record of gasoline consumption. The large oil corporations calculated the normal week day consumption at 600,000 gallons. During the first few days of the strike the daily consumption was about 1,000,000 gallons. This indicates fairly accurately that the use of motor vehicles was increased 66 2/3 per cent.

The adoption of the simple expedient of one-way traffic on the streets in the congested business district, new to Chicago but a system already giving satisfaction in other cities, did more than anything else to smooth out and facilitate the great volume of automobile traffic and taught the city a lesson that it seems inclined to profit by. In anticipation of the strike, the police department drew up a new traffic scheme making alternate north and south and east and west streets in the loop business district. Traffic signs were erected and policemen stationed at intersections to enforce this rule. The absence of street

cago's traction problem and it is certain that the automobile and tractor would have played a big part in such a settlement.

cars facilitated automobile traffic and by the morning of the second day of the strike motor vehicle traffic, with its greatly increased volume, was moving through the business district at greater speed than before the strike.

The possibility of the substitution of motor bus transportation also arose from the strike. Mayor Thompson borrowed a dozen busses and put them in operation over certain routes at a five cent fare. He announced his intention of asking the city council to authorize the purchase of 3,000 busses. Speaking of the head of the surface lines, the Mayor said:

"Henry Blair put his cars in the barn. We'll show him we don't need his cars. Offers of busses are coming to me from everywhere. If the aldermen will go along with my plan to put in permanent bus lines all over the city we will give Blair plenty of competition."

A privately owned bus line has been in operation in Chicago for a number of years between the loop and the north side. In the strike emergency this line increased its service as much as possible. A number of sight-seeing busses also entered the regular passenger business. The strike gave the city a new appreciation of motor vehicle transportation and showed the advantage of having heavily used business streets free of street cars. A natural result is increased public agitation for a subway in the business section for the electric railways.

In conservative quarters no one expects the complete substitution of motor vehicle transportation for electric street railway transportation, but it has been demonstrated that the motor vehicles may be relied upon to relieve an emergency and the opinion is freely expressed that if the strike results in the adoption of a permanent one-way traffic system and other regulations to make city driving more comfortable and satisfactory it will have been a blessing not only to the automotive trade but to the whole public.

Mid-Year Car and Truck Registration Shows Increase of 1,350,552

Tabulations by Automotive Industries

ON July 1, 1922, there were 1,350,552 more cars and trucks in the United States than on July 1, 1921. This is a gain of 14.6 per cent over the mid-year figure of 1921 and indicates that the final 1922 statistics will record another marked increase in motor vehicle registrations. Already the Dec. 31, 1921, total of 10,505,660 has been exceeded by 102,467. Thus, all the registrations made during the last six months of this year will represent an increase over the 1921 total.

Ten million six hundred and eight thousand one hundred and twenty-seven cars and trucks were registered in the United States on July 1, 1922. Fees collected have totaled \$125,052,346, an increase of \$27,390,364 over July 1, 1921. There is now one motor vehicle for every 10.16 persons in the United States, using July 1, 1921, population estimates as a basis.

New York maintains its place at the top of the list with 812,138 cars and trucks, while Ohio is found as usual in second place with 760,000.

The largest gain over July 1, 1921, is recorded by New York, which shows an increase of 161,608. The largest percentage gain for the same period has been made by the District of Columbia, which jumped up 48 per cent.

Six states show a smaller registration than last year at this time. Those which dropped were New Mexico, Wyoming,

RANK OF STATES BY REGISTRATIONS July 1, 1922		
New York	812,138	111,447
Ohio	760,000	108,779
California	722,853	105,029
Pennsylvania	716,644	90,250
Illinois	676,748	88,719
Michigan	493,246	87,129
Iowa	460,069	84,449
Texas	449,436	83,624
Indiana	425,000	78,055
Massachusetts	367,706	77,419
Wisconsin	357,968	74,947
Missouri	338,426	63,420
Minnesota	336,000	55,700
Kansas	288,742	51,406
New Jersey	287,859	47,094
Nebraska	216,902	42,608
Oklahoma	187,000	40,700
Washington	181,762	37,452
North Carolina	162,942	32,847
Virginia	150,000	27,057
Colorado	145,000	21,800
Maryland	130,631	20,207
Kentucky	129,100	10,544
Connecticut	127,773	
Georgia	126,500	
Tennessee	117,000	
		10,608,127

West Virginia, South Dakota, Utah and South Carolina. The total registration loss in these states, however, is only 13,093, so that the net gain over last July is not materially affected.

A very large number of states, however, have failed to reach a point as high as that of the final Dec. 31 registrations of 1921. More than half of the states, in fact, are still below the 1921 total. This has not usually been the case, although a similar situation prevailed last year in July. Despite that fact, all but four states recorded gains before the final count in December.

The first six months of 1922 have wit-

nessed a remarkable industrial comeback from one of the worst depressions the country has ever had. Farmers have been doing better this year, but have had many debts to liquidate. For this reason it is probable that registration officials have been more ready than usual to allow the farmer considerable leeway.

In some states the practice has always been to refrain from enforcing the registration law in agricultural districts until late in the year when the crops have been harvested. This year, because of the unusual economic conditions, it is logical to assume that this practice has been more widespread.

Since nearly all of the state registration years run from January to January, however, the only figures with which the July 1, 1922, figures can be properly compared are the July 1, 1921, figures. On this basis, a gain of nearly a million and a half vehicles is recorded.

A study of the table showing percentage gains and losses in registration gives some interesting facts in answer to the perennial "saturation point" arguments.

The largest percentage of gain in registration has been made in those states which already had the largest number of vehicles. New York, Ohio, California, Pennsylvania, Indiana, New Jersey—all high registration states—each show an increase of more than 15 per cent over last July. In fact, New York, which has more cars than any other state, gained more than any of the others mentioned, having an increase of 24.8 per cent.

With increased registration has come an increase in the amount of fees paid by motorists. Up to July 1, 1922, car and truck operators had paid into the state treasuries a total of \$125,052,346, an increase of \$27,390,364 over the sum

GAINS AND LOSSES IN REGISTRATION JAN. 1 TO JUNE 30, 1922			
Gains—		Losses:	
California	49,023	Oklahoma	34,300
Ohio	39,368	Nebraska	21,802
Pennsylvania	27,055	Texas	18,180
Indiana	24,653	Maryland	9,941
District of Columbia	16,310	Connecticut	9,753
Michigan	16,209	Oregon	9,546
Wisconsin	16,127	Missouri	8,011
New Jersey	14,865	South Dakota	7,827
North Carolina	14,258	Utah	6,823
Virginia	9,000	South Carolina	6,097
Arkansas	7,501	Georgia	5,442
Minnesota	7,300	New Mexico	4,496
Florida	7,192	Idaho	4,200
Massachusetts	6,974	North Dakota	3,925
Illinois	6,314	West Virginia	3,644
Alabama	4,786	Washington	3,597
Louisiana	3,124	Rhode Island	3,551
Kentucky	2,729	Montana	3,085
New Hampshire	569	Kansas	2,567
Vermont	487	Arizona	2,202
Wyoming	438	Mississippi	1,719
Delaware	387	Colorado	739
New York	107	Iowa	459
	274,781	Nevada	275
		Maine	108
		Tennessee	25
		Net gain	172,314
			102,467

Registration of Motor Vehicles

State	Total Net Registration	Non-Resident Registrations and Transfers	Passenger Cars	Commercial Cars	Motorcycles	Total Fees
Alabama	87,129	727	77,509	9,620	598	\$1,215,414
Arizona	32,847	2,018	.....	.....	185	202,544
Arkansas	74,947	.....	67,900	7,047	192	900,000
California	722,853	.....	689,163	33,690	14,299	7,219,160
Colorado	145,000	.....	136,000	9,000	2,100	900,000
Connecticut	127,773	10,810	105,560	22,213	2,144	3,155,701
Delaware	21,800	.....	.....	.....	338	384,727
District of Columbia	78,055	.....	69,496	8,559	2,357	347,153
Florida	105,029	2,470	87,838	17,191	1,287	1,400,000
Georgia	126,500	1,071	112,000	14,500	877	1,702,797
Idaho	47,094	524	.....	.....	601	725,000
Illinois	676,748	.....	591,437	85,311	6,063	7,193,861
Indiana	425,000	.....	380,000	45,000	5,152	2,734,403
Iowa	460,069	.....	431,798	28,271	3,089	7,315,221
Kansas	288,742	4,937	269,065	19,677	1,714	146,128
Kentucky	129,100	.....	114,307	14,793	841	1,952,422
Louisiana	83,624	.....	70,940	12,684	395	1,609,850
Maine	77,419	.....	66,307	11,112	1,073	1,184,390
Maryland	130,631	6,802	120,776	9,855	3,752	2,338,765
Massachusetts	367,706	30,370	310,003	57,703	9,064	4,588,038
Michigan	493,246	41,696	442,055	51,191	4,199	6,825,118
Minnesota	336,000	17,576	304,000	32,000	2,500	6,013,275
Mississippi	63,420	12,300	58,420	5,000	135	1,494,990
Missouri	338,426	.....	303,756	34,670	.....	3,039,317
Montana	55,700	313	49,850	5,850	251	540,133
Nebraska	216,902	7,408	198,717	18,185	1,101	2,670,827
Nevada	10,544	.....	.....	.....	80	97,114
New Hampshire	42,608	.....	.....	.....	1,493	823,165
New Jersey	287,859	24,876	216,418	71,441	7,364	5,457,151
New Mexico	20,207	.....	18,457	1,750	107	180,000
New York	812,138	.....	630,883	181,255	27,000	9,124,024
North Carolina	162,942	.....	147,488	15,454	.....	.....
North Dakota	88,719	3,800	86,354	2,365	584	613,990
Ohio	760,000	38,200	650,000	110,000	17,000	6,342,628
Oklahoma	187,000	.....	.....	.....	504	2,143,705
Oregon	108,779	8,169	96,465	12,314	2,424	2,973,378
Pennsylvania	716,844	49,728	660,262	56,382	15,704	11,046,479
Rhode Island	51,406	4,768	41,510	9,896	1,337	510,000
South Carolina	84,449	.....	77,833	6,616	497	.....
South Dakota	111,447	.....	103,731	7,716	485	672,152
Tennessee	117,000	6,300	103,000	14,000	1,000	1,386,000
Texas	449,436	58,954	.....	.....	2,833	3,630,840
Utah	40,700	.....	34,800	5,900	565	645,815
Vermont	37,452	1,727	35,276	2,176	669	680,741
Virginia	150,000	.....	130,000	20,000	1,500	2,000,000
Washington	181,762	9,706	154,340	27,422	2,788	2,980,017
West Virginia	90,250	3,758	86,200	4,050	950	1,832,267
Wisconsin	357,968	.....	333,754	24,214	4,813	3,821,512
Wyoming	27,057	.....	24,223	2,834	253	292,134
TOTALS	10,608,127	349,008	8,687,891	1,128,907	154,257	\$125,052,346

GAINS AND LOSSES IN REGISTRATION July 31, 1921-JUNE 30, 1922

Gains—	Connecticut	9,663
New York	161,608	7,848
Ohio	136,684	7,306
California	133,990	6,505
Pennsylvania	107,376	5,517
Indiana	80,110	4,832
Illinois	75,766	4,694
Massachusetts	67,679	4,200
Michigan	57,738	4,000
New Jersey	50,520	3,000
Wisconsin	42,194	2,409
Minnesota	41,295	1,672
Iowa	34,713	1,351
Missouri	32,624	993
Texas	31,310	964
Tennessee	30,395	872
Virginia	30,000	1,363,645
District of Columbia	25,671	.....
Washington	22,183	.....
Kentucky	21,607	4,200
Maryland	17,726	3,658
Arkansas	16,666	2,943
Florida	15,331	1,673
North Carolina	15,032	436
Alabama	13,053	183
Louisiana	12,624	13,093
Colorado	12,500	1,350,552
Maine	11,429	Net gain 1,350,552

collected during the first half of 1921. Thus, while motor vehicle registrations increased about 15 per cent, the registration fees collected increased about 28 per cent.

This analysis shows that motorists are paying more per car in registration fees than in previous years. The increased total revenue thus collected by the states can properly be used for highway maintenance, so that motor vehicle traffic can operate efficiently and economically throughout the country.

As an indication of how lax law enforcement affects registration figures, the following paragraph from a letter just received from the research bureau of the Oklahoma City "Times" is of interest:

"In Oklahoma the motor vehicle register law is not rigidly enforced and for this reason it is practically impossible to tell exactly at this time the number of cars in the state."

Development of Automobile Refinishing

Improved Materials and Methods Needed by Both Manufacturers and Dealers

AUTOMOBILE refinishing remains the one undeveloped branch of the automotive service field.

Mechanical service started with the industry and it is due to its rapid development that today's enormous production schedules can be successfully carried out. The manufacturer constructs a car and delivers it to the purchaser, but the responsibility of seeing that the purchaser gets the maximum service from this car is transferred to the maintenance station along with the delivery of the car. And without a liberal distribution of such stations there could be no liberal distribution of automobiles,—each depends upon the other.

The manufacturer has made rapid strides in the development of design, sometimes in co-operation with the maintenance experts and sometimes not, and in the latter's efforts to keep abreast the times, a vast array of devices has been designed that take the place of brute strength and the rule of thumb. A garageman who is equipped to sell maintenance may decide to expand by giving service on batteries and tires. He chooses from a number of outfits, makes the installations, reads the instructions and is ready to go ahead. It is largely a matter of installing an outfit that will do the work.

And right there perhaps we can find the reason why the refinishing of cars remains in its present undeveloped state.

By refinishing, we mean repainting, enameling and trimming. There is no apparatus that can be purchased that alone will perform either of the three. In every case the necessity exists of obtaining skilled labor, and if this could be readily employed, there would be a different condition in this field. Skilled automobile painters are few and far between, as well as skilled enamelters. The factory type is a specialist who may work on one operation for years without learning the science of the entire work. The custom shop painter is in a little better position to diversify his work, but in such shops there is usually only one man who knows the work in its entirety and he is the foreman—to say nothing of the fact that there are good, bad and indifferent foremen.

If 1,000 so-called auto painters applied for a job and were tried out by a competent board of judges to determine their knowledge of all phases of the work, probably 100 or less would qualify. And that is the labor situation that confronts not only the manufacturer but the dealer as well. Schools to instruct those in-

terested in learning the trades are in order and MOTOR AGE has from time to time told its readers of the work accomplished by the Chicago College of Auto Painting. This school has home-study courses for the man who cannot leave his business to attend a resident school. This College is installing a resident course, as well as a modernly equipped shop.

The need for such institution exists not only in Chicago, but in other cities as well. The progress made in the development of both materials and methods has been slow—slow in the factories but even slower in the dealer establishments—and methods that have been used successfully in factory production for years have not yet found their way into custom shops.

Force Drying Saves Loss of Time

The paint materials used on automobiles dry by oxidation, that is the drying oil that they contain so dries, or oxidizes, and when exposed at normal temperatures the time required for this drying may take from a few hours to a few days—depending on the nature of the material itself. It is natural that factories with large production schedules would try to eliminate all loss of time, and in the drying schedules for the paint coats much room for improvement is found.

Years ago it was found possible to speed up the drying rates on these paint coats by placing the painted body in an oven where the heat could be increased in order to accelerate the drying. This method is known as force-drying and is today used by the majority of factories that are operating on a large production basis.

Figure 1 shows such an installation in the factory. The ducts or hot air conveyors that supply the heated air to the room are shown with their curved, damp-

ered ends along the floor level. Bodies enter the room supported on trucks that are carried along the tracks shown, and their progress from one end of the oven to the other is so timed that they are dry when they emerge.

The heated air that is blown into the room is washed free of all dirt, then given the proper moisture and heat and passed into the ducts. The moisture content of this air is at all time theoretically perfect to obtain the best drying, and the temperature is regulated to suit the work. As a rule the first coats receive the highest temperatures which grade down to the final coats.

This installation is large and not suited to the custom shop needs, but in Figure 2 we see a force-drying room that in size is well suited, except that the doors and compartments would have to be designed to fit the floor space and production requirements. The apparatus which washes, moistens and heats the air is shown in the foreground. It contains a heating element in its center supplied with about five pounds of steam, from a boiler, not here shown, and a blower in the top sucks the air in at the opening below and discharges it into the room alongside.

Drying rates on paint materials that are force-dried in these rooms is about one-fourth that of the old method of air-drying. The drying schedule is uniform and does not vary with the weather, and as it can at all times be controlled, it is therefore ideal.

Figure 3 shows a small installation of such an outfit that could be adapted to hold from one to five cars. By the use of such outfits the present schedules of custom shops can be materially shortened and greater production obtained from the same amount of floor space. Instead of taking 30 days for a high grade job of "burn off and repaint" the work can



Figure 1

The force drying room of a large factory. Such an installation is thoroughly effective but too large for the custom shop

be force-dried and turned out in about a fourth that time—to the great delight of both shop and car owners.

This force-drying is all done at comparatively low temperatures, but the baked-on finishes on an automobile, or enameling, is all done at high heats. Most force-drying is done at temperatures ranging from 100 degrees up to 140 degrees, while the heat used in enameling may go to 400 and over. An entirely different class of paint materials is used, as the materials used in force-drying will not stand high heats and those used in enameling will not harden at the low heats of force-drying.

In the ovens used for this high-heat enameling one finds a variety of types using gas, electricity or fuel oil as the source of heat. The first ovens were gas burners, then came electricity to compete, and now fuel oil is chasing electricity. Recent tests on ovens heated by electricity and fuel oil showed a fuel operating cost of \$125 for electricity against \$14 for fuel oil over a 28 hour period.

Custom Shops Need Enameling Ovens

Enameling is a necessary branch of refinishing—nearly all fenders, aprons and hoods, especially where black, are so finished in the factory and it becomes necessary for the custom shop to duplicate such finishes. They are harder than the air-dry finishes but offer no decorative color combinations as their use is almost entirely confined to black. Few custom shops carry the equipment for this work and depend upon the outside specialty shops for their needs, but any up-to-date refinishing plant should have its own enameling ovens.

The greatest source of grief that the custom-shop complains of is the cleaning and removal of paint. It is tedious work to clean a dirty chassis by hand and also particular work, as paint cannot be applied over a greasy surface and made to stay. If the shop is supplied with a wash-rack and able washer, the present day standard is fulfilled.

The removal of bad paint from the body is still considered a hand operation by some of the largest shops in the country. There is ample room for improvement in both operations. The sand blast has been used with indifferent results for some time and is still used in some places. But the advent of apparatus specially designed for the cleaning and removal of paint is at hand and when more universally tried out and standardized will do much towards simplifying this troublesome work.

Solving Paint Removal Problems

There are quite a number of these devices now being offered on the market and, while all have their faults, they at least constitute a foundation on which improvements can be built. A non-volatile paint removing solution is played onto the surface under pressure of steam, air or the city water mains and the paint is removed. These solutions are alka-

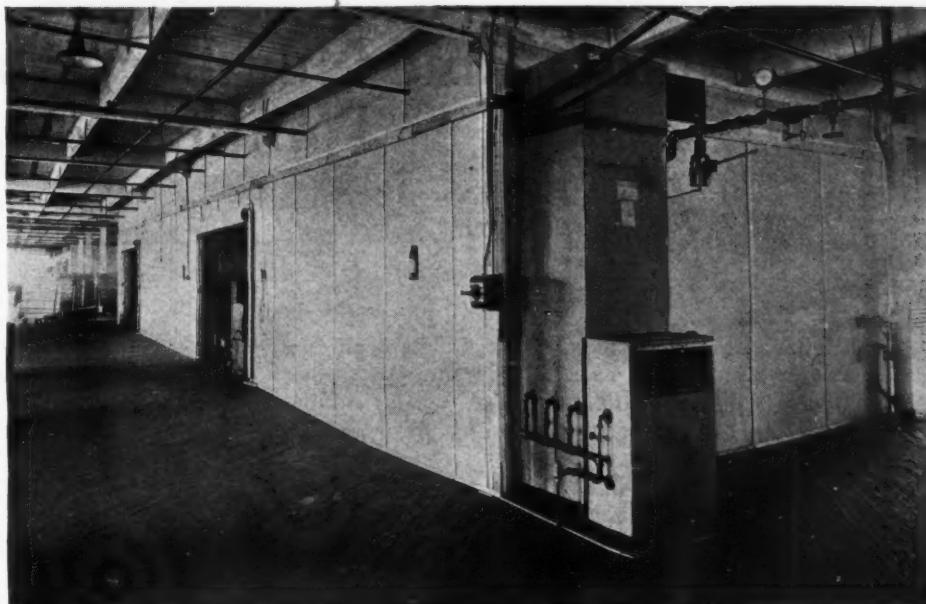


Figure 2

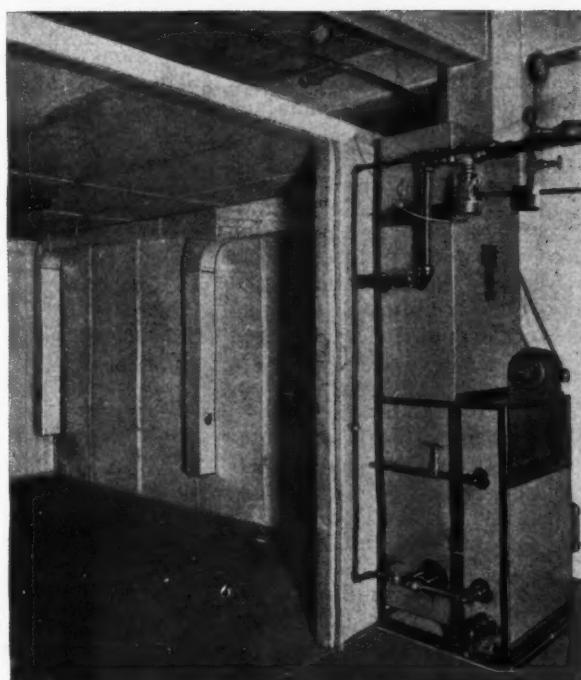


Figure 3

line mixtures and are applied at a temperature close to the boiling point where the design permits. The solution of the problem is not far distant.

Such are the problems, or at least a few of them, as they exist in the refinishing field today. Chicago is soon to be able to boast of an establishment that will incorporate all of the features previously mentioned, whereby the maximum of service can be given both car owners and dealers in their refinishing work. The Chicago Automobile Refinishing Works, Inc., has announced the construction of a plant that will carry these plans into practice. The staff of the Chicago College of Auto Painting is behind the undertaking and a supply of qualified executive talent is therefore at hand. The educational work of the Col-

lege will be continued and a resident course of study added to the present home-study course.

FIRST JAPANESE CAR

WASHINGTON, Aug. 5.—The first practical automobile, Japanese built, has been perfected and is now being manufactured in Tokyo. It has been given the trade name of "Jitsuyo," and is being manufactured at the rate of 50 cars per month, being built by the Jitsuyo Jidosha Seizō Company, of Tokyo.

The Jitsuyo is the result of three years' work by an American engineer, formerly employed by the Ford Company, and is a two cylinder, three wheeled car, with an air cooled motor and has a maximum speed of thirty miles an hour.

Above is another room of a type, permitting adaption to custom needs. The apparatus which washes, moistens and heats the air is shown in the foreground

To the left is a small force drying room which can be adapted to hold from one to five cars.

Motor and Frame Number Systems to Prevent Tampering

Practical Suggestions and Samples Offered by the Society of Automotive Engineers

PROBABLY a good many dealers have been annoyed at various times by cars coming into their places of business with the manufacturer's serial number or the engine number obliterated. Where only a brass plate or some similar device is used and is riveted to the frame or body it is a relatively easy matter for a thief or deceitful person to remove the plate and put in place of it another plate bearing an entirely different number.

To overcome this evil and find a tamper-proof numbering system has been part of the work of the Society of Automotive Engineers in the last year or so. The problem was assigned to the Passenger Car and Engine Division with the hopes that it could devise or obtain some system of numbering the motors and frames that will make it impossible to change or obliterate the numbers without any ordinary person, such as a policeman, being able to detect the change. For instance, if the numbers were on a detachable plate and a new plate with a different number could be put on, it would not be possible to detect the change. However, if such a change were attempted, and its execution involved marring the frame or motor to such an extent as to be easily detected, the system would be considered practical. In brief, the numbering system should be of such a nature that either the numbers could not be changed, or in case they could be changed it would leave such marks that any policeman in casually glancing at the car could tell immediately if the numbers had been tampered with.

The problem was taken up by the Passenger Car and Engine Division and a preliminary report was made at the last winter meeting. The work has been carried on in collaboration with the Underwriters Laboratories, and the plan of casting raised numbers on the crankcase has been definitely turned down by the Underwriters.

Following is a summary of the plans proposed to date: Casting numbers on the crankcase (not applicable to frames); use of expanded disks; casting a special alloy in the crankcase; using a checker board system; casting a small, thin fin on which numbers could be stamped, on the crankcase, so that the numbering fin could be broken off by the dealer and held for the purchaser; welding raised number plates to the frame; armor plate number plates riveted on, using two or more rivets which enter into the frame construction; embossing fairly large numbers deeply into the frame; punching or drilling small holes in the frame at such a place that it will not be weakened; insetting the number under a glass cover in a spring bracket or other accessible casting or forging in the frame assembly (also for motors); a thin plate with the number embossed in it held in a frame or riveted or blind-screwed to the car frame; an armored plate riveted down and a special seal of some sort placed over the rivets; case-hardened plugs or plates bearing the numbers fastened into the frame with blind screws or some similar device (also applicable to motor); a plate or bakelite or some similar material over the numbers and fastened behind the channel as in the preceding plan (also applicable to motors); setting a series of nickel embossed plates somewhere in the frame or in the engine in such a way that they would not be removed without tearing down the engine or frame (the reason for the use of nickel being that it is not easily affected by the acetylene torch.)

The following suggestions have been actually embodied in the form of samples:

1.—A depression is cast in the front spring hanger and a

series of thin nickel plates with perforated numbers is set in. The plates are held in position by the spring hanger rivets, the numbers showing through a slot cut in the web of the side rail. The nickel plates will not stand the heat of a torch. If necessary, these can be welded in.

2.—A heat-treated nickel steel plug with numbers stamped on circular serrations held in the frame side rail by a heat treated nut with set screw through it, the head of which is broken off.

3.—Same as No. 2 except tool steel.

4.—Numbers and bakelite cap moulded on heat treated nickel steel plug which is held in side rail by heat treated nut with set screw through it with head broken off.

5.—Circular serrations put in side rail by frame manufacturer on which the car manufacturer would stamp the serial number.

6.—Line waves stamped in side rail by frame manufacturer on which the car manufacturer would stamp the serial number.

7.—Tool steel plug held in wall of crankcase with heat treated nut and set screw through it with head broken off.

8.—Same as No. 7 except nickel steel, heat treated.

9.—Numbers and bakelite cap molded on heat treated plug which is held in crankcase with heat treated nut with set screw through it on which the head is broken off.

10.—Numbers stamped on crankcase wall and a glass placed over the numbers. The glass rests on a cork gasket, and is held by a snap ring of liberal size which locks in a groove cut in the case. A steel ring pressed in place conceals the snap ring.

11.—A heat treated tool steel plug cast in the crankcase. A chill is placed across the plug so the heat will not soften it.

12.—A sample has been made showing how plug is to be cut for casting in crankcase.

13.—Nickel numbers cast in aluminum crankcase, the numbers being high enough to go through the wall of the crankcase and projecting about $\frac{1}{8}$ in. on the outside.

14.—Same as No. 13 except through cast iron case.

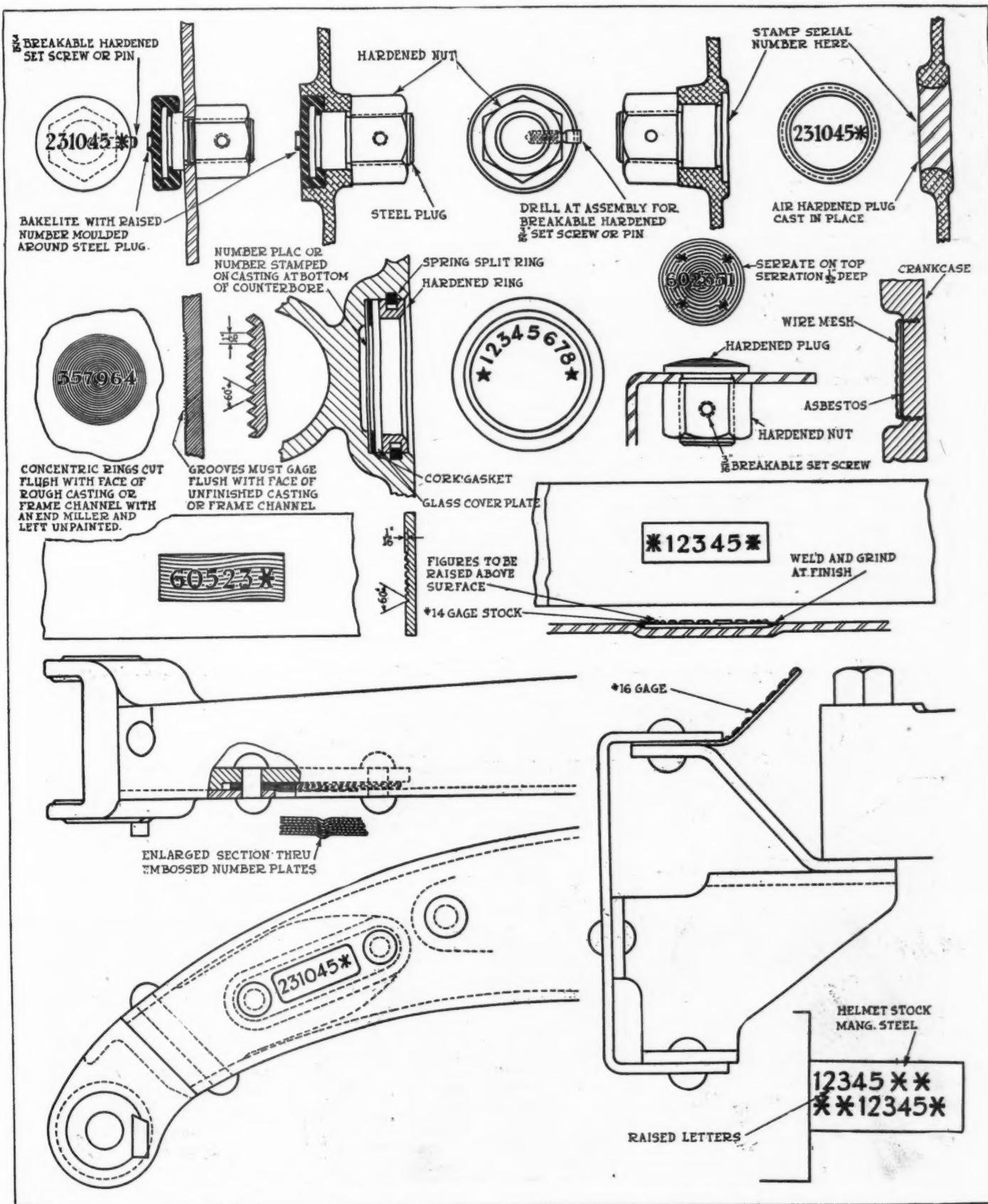
A great many additional suggestions have come in recently and samples of the promising ones among them will be made up later. The ideas which have been embodied in samples are the ones which seem the most practical among those received up to a short time ago.

Monster Gasoline Driven Grass Cutting Machines

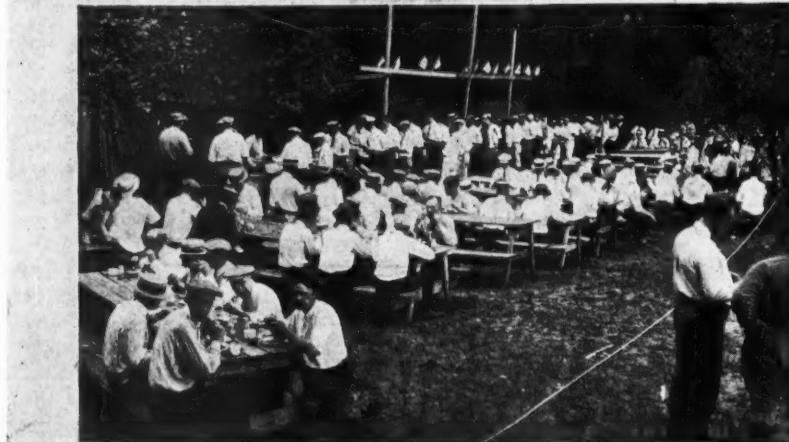
DARBY, Pa., Aug. 3.—A special harvesting machine is being built here to cut the salt grass in Florida swamps for paper making. The machine, the first of 11 already ordered, is described as a combination tank and gasoline-propelled barge and can operate either on land or in water. It is equipped with a caterpillar belt and two paddle wheels, is 75 feet long and 15 feet wide and is constructed of steel and wood. A crew of three men operates the machine, which is equipped with two 75-horsepower gasoline engines.

The marsh grass when cut is about 15 feet long. It is chopped into pieces three inches long and then thrown into barges through a blower. The Norbom Engineering Co., Inc., the designers and builders of the device, spent \$80,000 on the first one and the cost of the next ten machines, it is expected, will be about \$50,000 each. The machines are being built for the Grass Fiber and Paper Co., of Leesburg, Fla.

This Diagram Shows the 14 Protective Numbering Systems for Which Samples Have Been Prepared



MOTOR AGE'S PICTURE PAGES

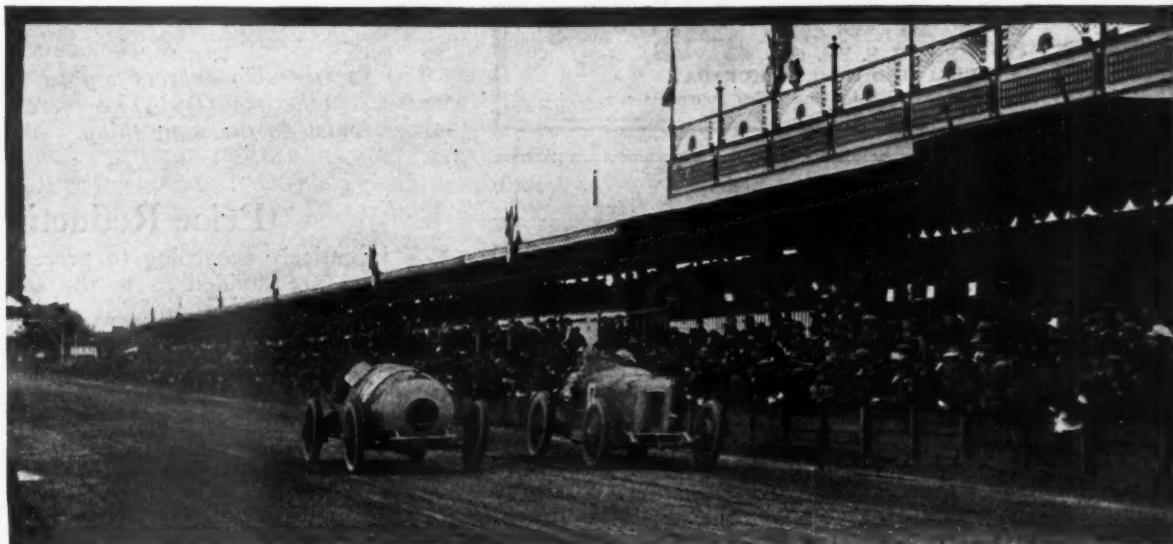


Three photographs of the annual field day outing of the Chicago Automobile Trade Association. On the left at top is picture showing burst of speed symbolic of the rapidity with which Chicago dealers have been selling automobiles. At right, the barrel race, in which barrel-shaped man had as good a chance as the clothes-pin variety. Below, at left, a table d'hote fried chicken dinner of inexhaustible supply is adding to the happiness of the crowd.

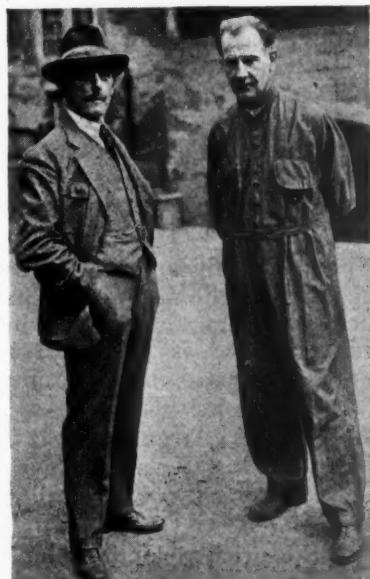


Boy Scouts of Pasadena, Cal., cooperated with the Automobile Club of Southern California in a clean-up week to save tires. This picture shows the heap of tire-destroying rubbish which they collected.

OF AUTOMOTIVE INTEREST



Biaggio Nazzaro (Fiat), who was later killed, passing Viscaya (Bugatti) in a burst of speed in front of the Grand Prix grandstand.



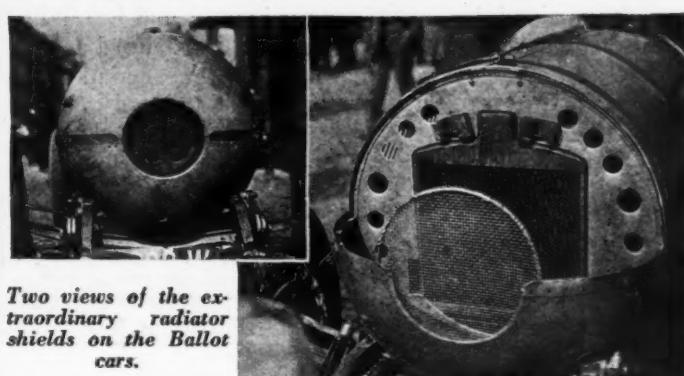
W. F. Bradley, Motor Age's Paris correspondent, discussing the Grand Prix with Felice Nazzaro, the winner



Bordino in his Fiat made the fastest lap of the 122 cu. in. Grand Prix. The lap was made in 5 min. 43 sec., at a speed of 87.23 m.p.h.



Felice Nazzaro, the winner, taking a short corner.



Two views of the extraordinary radiator shields on the Ballot cars.

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Paint and the Used Car

PAINT is being seriously considered by many dealers as a long step toward the solution of the used car problem. During the last year a number of Chicago dealers have established paint shops for putting the proper sales touch on cars that have been reconditioned. It has come to pass that practically no buyer of a car is willing to take "any old thing that will run," but that a proper appearing car is demanded.

Paint does not cost much when economically put on. Also the paint job should be gaged somewhat in quality by the age and condition of the car. Used Ford sedans have brought a very good price in the second hand market in Chicago when the body was painted in color and the top black. Roadsters of standard makes are easily transformed into sport cars with a bit of body work, some live color of paint and a few accessories. They also have met a good demand.

Probably a paint shop and a good painter is a trifle expensive for most dealers, especially in the smaller cities. But a combined paint and top shop is a legitimate, co-operative enterprise and there are few communities that cannot support a shop of this kind, with practically all of the dealers of the community as stockholders.

Few property owners would attempt to sell a house without "painting it up." The automobile is almost as valuable as a house, so why not profit by the experience of the smartest of all traders—the real estate dealer.



The farmer who expects a good harvest cultivates his prospects (the plants). The merchant who expects a harvest must do the same thing.



Price Reductions

IT is entirely according to precedent that automotive dealers are divided as to the effect on sales of the recent price reductions. It is according to precedent that some dealers are talking about these reductions in entirely the wrong spirit. Some dealers are openly discussing with their customers the prospect of a price war. Some dealers are angry that they were not taken into the confidence of the factories. Some decline to take a reasonable view of business at all.

But the majority of the dealers hail the reductions as evidence of good faith and some are putting renewed energy into the sale of cars, regardless of whether the price has been reduced or not.

The business world apparently is mystified by these reductions. The trouble apparently is that business generally has never quite conceived the honesty of the automotive industry. In most cases, price reductions of vehicles have resulted from volume production which reduces the overhead cost of producing vehicles rather than from sales competition. The automotive manufacturers have been honest enough to pass their savings on to the buyer, a position which puzzled many manufacturers in other lines.

Another feature that is not generally appreciated by manufacturers in other lines is that the automotive industry is constantly reducing manufacturing costs by improved production equipment and is passing this saving on. In the more settled lines of manufacture, this attitude also is a mystery.

One thing is significant. To a very large extent it is the companies that have been making the most money that have reduced prices, not those that are struggling for business and existence.

More than anything else, the price reductions indicate the belief of the manufacturers that the large volume of sales is to continue.



Have you sold automotive equipment to any of the defunct railroad branch lines in your neighborhood?



Mailing Lists Again

HAVE you looked over your mailing list recently? Do you know what each letter you send out on this list costs? Do you know how much you waste every time you order letters sent out on the old list?

The MOTOR AGE mail this morning was a good example of waste. Five communications from one company asking a favor and not one of the communications properly addressed! Two of these communications carried an address that was more than six years old. Three were addressed to individuals who have not been connected with MOTOR AGE for years.

This is not unusual. Only recently there was an

epidemic of mail to MOTOR AGE that was addressed on a list that was more than six years old. Of what real use can a list that old be? The waste is terrific and the postoffice is clogged with dead letters and communications that must be transferred from carrier to carrier, each transfer taking up time.

Motor vehicle dealers who are placed on lists as prospects and then continue to receive prospect mail after they are owners are likely to lose confidence in the efficiency of the dealer organization they have patronized. It is quite provoking to buy a vehicle and then a month or so later receive an announcement of a price reduction, with an appeal to hurry and buy.

Neglected mailing lists are likely to prove a boomerang.



A flat rate estimate on the job avoids many a quarrel.



A Street Car Strike

HERE was a widespread popular opinion that the Chicago street car strike would be a great boon to the automotive dealers, taxicab companies and other established automotive concerns. A short experience with the strike of last week quickly dispelled this impression. Sales slowed up in the new and used car salesrooms and the taxicab business, after the first rush, dropped off smartly from the every day standards. Maintenance experienced somewhat of a boom and the effects of the increased and severe use of the vehicles will increase the business in the shops for some time. Also there will be a smart demand for fenders and bumpers after the strike is ended. The gasoline sellers reaped the immediate harvest.

However, the automotive business will profit by this strike in the long run. The increased public respect for automotive transportation will be worth much. The automotive transportation kept the emergency business going but it could not keep the shopping or social life to normal. Perhaps the vehicles were equal to the job, but the organization was not sufficient and people cancelled engagements that were not of importance.

The greatest benefit will come in bringing to the minds of those who govern Chicago the necessity of modern traffic regulations. The one way street was introduced, many years after it was due. A realization of the congestion caused by the parking graft will be a big step. It is no secret that those who govern the downtown streets have for years sold parking privileges to car owners. On the fourth day of the strike the left turn was barred, another novelty to Chicago that is working well in other communities.

It was also demonstrated that decent and safe traffic will not be available until the pedestrian is controlled. This individual during the early days of the strike—as previously—was a law unto himself, going here and there at will and carrying death and destruction with him.

If Chicago traffic can be modernized through this strike, the subsequent benefits will offset to the automotive trade the loss of business during the strike.



"Invite us to your next blowout" is the suggestive line on a trouble wagon.

Look over the manufacturing plants in your community and see how many need more trucks and how many should have busses to bring employees to work.



Noah and Maintenance

ONE of the Webster definitions for maintenance is "To hold and maintain in a state of efficiency."

This broad definition of a now commonly used word enables its application to every conceivable form of industrial activity. We know that whether it be applied to the comparatively simple process of maintaining a wheel barrow or to the complexities of motor vehicle maintenance, there are required for its realization the presence and actions of certain factors. It is certain that before maintenance can be given to any article, it is first necessary that the maintenance facilities be provided and the facilities that provide the maintenance must in turn themselves be maintained.

Especially is this true in the institution that is engaged in the maintenance of transportation units as a means for deriving revenue. The animate and inanimate facilities which are the body and soul of the institution make necessary a maintenance within a maintenance which, according to its degree of perfection towards 100 per cent efficiency, determines the overall or dollars and cents efficiency of the effort.

In short before the maintenance institution can profitably sell maintenance, which is its first function, it must first possess the knowledge that will enable it to maintain its maintenance facilities.

The animated facilities are the human element including the ultimate consumer but particularly the personnel. They must have sufficient knowledge of the work to enable them to do their specific tasks. To efficiently apply that knowledge, the individual must be provided with the inanimate facilities for the actual operation. This broadly is the application of internal or self maintenance. It is the fundamental or basic thought that must be borne in mind—it is the maintenance viewpoint. This idea specifically carried out in the maintenance operations of varied industries entails the dispensing of knowledge peculiar to each industry. Highly specialized and diversified knowledge is required by some of these industries,—the automotive industry being in the first division in this respect. The agents most valuable in supplying this specialized knowledge are the various educational institutions, the trade school, the university, the factory apprentice and experimental schools and the printed sheet of the text book and the industrial and trade papers.

The first named are the sources of the fundamentals, they supply the basic idea but the industrial school and trade journal carry on from where the other agents leave off. The industrial journals record on their pages in a specific manner the current activities and practices of the field they serve. They are the weekly or monthly bulletins which show the present trend and make possible a forecast of the future developments of their particular industry.

The automotive dealer paper is to the automotive dealer what the newspaper stock quotations are to the investor. Be it a question on service and sales station architecture or a problem in electrical trouble shooting, its answer is being supplied weekly. Why don't you dealers apply it?



The man who stops advertising when sales slow up hasn't the idea at all.

Many Companies Reduce Prices

Lower Lists on Leading Makes Arouse Interest

Reductions on Buick, Oakland, Oldsmobile, Chevrolet, Studebaker, Nash and Others

CHICAGO, Aug. 8—Price reductions by a number of leading automobile manufacturers in the last week have created considerable interest throughout the automotive industry and led to speculation as to what other makers are likely to do.

General Motors Corporation took the lead in the downward price movement, its new list on Oldsmobile having been announced in MOTOR AGE July 27. In MOTOR AGE of Aug. 3 new prices on Buick and Oakland models were announced. This week lower prices are announced by Chevrolet, Studebaker, Nash, Chandler, Cleveland, Sayers Six, Haynes, Chalmers, Jewett and Hupmobile. A number of truck and motorcycle reductions also are announced.

Haynes Models Reduced

KOKOMO, Ind., Aug. 7—Price reduction of \$100 on open models and \$200 on enclosed models are announced by the Haynes Automobile Co., effective Aug. 2. The list follows:

	Old Price	New Price
Phaeton	\$1595	\$1495
Roadster	1645	1545
Coupelet	2295	2095
Sedan	2595	2395

Chandler and Cleveland Prices

CLEVELAND, Aug. 5—Price changes in both the Chandler and Cleveland lines are announced, effective Aug. 2. With the Cleveland the drops ranged from \$10 to \$100 and with Chandler from \$20 to \$300. The new lists are as follows:

	Old Price	New Price
5-pass. Phaeton	\$1595	\$1495
4-pass. Chummy Rdstr.	1595	1495
2-pass. Roadster	1595	1495
7-pass. Phaeton	1695	1645
Dispatch (open)	1695	1645
Royal Dispatch	1795	1745
Coupe	2295	1995
5-pass. Sedan	2395	2295
7-pass. Sedan	2395	2295
Limousine	2995	2895
Cleveland		
5-pass. Phaeton	1195	1095
Chesterfield	1295	1260
2-pass. Roadster	1175	1085
Sedan	1595	1585
Coupe	1550	1495

\$500 Price Reduction

DETROIT, Aug. 4—The Signal Motor Truck Co. has cut \$500 from the prices throughout its entire line. The changes are as follows:

Model	Old Price	New Price
N. F. 1-ton	\$1950	\$1450
H. 1½-ton	2450	1950
I. 2½-ton	2875	2375
M. 3½-ton	3675	3175
R. 5-ton	4400	3900

Studebaker's New Prices

SOUTH BEND, Ind., Aug. 5—Substantial price reductions have been announced by the Studebaker Corp. of America on all its models effective Aug. 1. The reductions range from \$70 to \$200 on the light sixes and \$175 to \$300 on the special sixes and \$135 to \$225 on the big sixes. The new schedule is as follows:

	Light Sixes—	Old Price	New Price
Chassis		\$ 875	\$ 785
2-passenger Roadster	1045	975	
Touring Car	1045	975	
Coupe	1375	1225	
Sedan	1750	1550	
Special Sixes—			
Chassis	1200	1000	
2-passenger Roadster	1425	1250	
Touring	1475	1275	
4-passenger Roadster	1475	1275	
Coupe	2150	1875	
Sedan	2350	2050	
Bix Sixes—			
Chassis	1500	1300	
Touring	1785	1650	
Speedster	1985	1785	
Coupe	2500	2275	
Sedan	2700	2475	

Nash Reductions Announced

KENOSHA, Wis., Aug. 4—The new price list announced by the Nash Motors Co., effective Aug. 1, shows reductions ranging from \$50 to \$200 on the various models. The list follows:

	6-cylinder Models	Old Price	New Price
5-passenger Phaeton	\$1390	\$1240	
7-passenger Phaeton	1540	1390	
Sedan	2390	2190	
Coupe	2090	1890	
Roadster	1360	1210	
Sport model	1545	1395	

	4-cylinder Models—	Old Price	New Price
Phaeton	\$ 985	\$ 935	
Roadster	965	915	
Coupe	1485	1385	
Sedan	1645	1545	
Cab	1295	1195	
Carriole	1350	1275	

Lower Chevrolet Prices

FLINT, Mich., Aug. 3—A new price list with reduction on all models except the phaeton has been announced by the Chevrolet Motor Co. The list follows:

	Old	New
	Price	Price
Superior models—		
Roadster	\$ 525	\$ 510
Phaeton	525	525
Utility coupe	720	680
4-pass. coupe	850	840
Sedan	875	860

F. B. models—	Old	New
	Price	Price
Roadster	975	865
Phaeton	975	885
Coupe	1,575	1,325
Sedan	1,575	1,395

Commercial models—	Old	New
	Price	Price
Superior chassis	425	
Light Delivery	510	
G. Truck Chassis	745	650
T. Truck Chassis	1,125	1,095

Jewett Reduces Two, Increases Two

DETROIT, Aug. 7—A new price list on Jewett cars showing reductions on the roadster and phaeton and increases on the coupe and sedan has been announced

Coal Shortage Hits Ford Plant; Only 14 Days' Supply

Company Offers Use of D. T. & I. Railroad to Haul Fuel From Kentucky Mines

DETROIT, Aug. 5—Ford Motor Co. has but 14 days' supply of coal according to an application for priority shipments filed with the Michigan State fuel administration offices in Lansing this week. If supplies are not available within that time its plants at River Rouge and Highland Park and the Lincoln plant will be compelled to either close or go on such limited production as may be possible through the use of Detroit Edison power or auxiliary power generated with other fuel than coal.

Up to the issuance of the priority regulations by the Interstate Commerce Commission the company had been hauling daily supplies over its Detroit, Toledo & Ironton railroad, but this supply is now cut off.

by the Paige-Detroit Motor Car Co. The list follows:

	Old Price	New Price
Phaeton	\$1065	\$ 995
Roadster	1065	995
Coupe	1395	1445
Sedan	1395	1465

Chalmers Models Reduced

DETROIT, Aug. 7—Reductions of from \$150 to \$400 are announced on various models of Chalmers cars by the Maxwell Motor Corp. The new list follows:

	Price	Price
Roadster	\$1345	\$1185
5-pass. phaeton	1395	1185
7-pass. phaeton	1495	1345
Coupe	1995	1595
Sedan	2295	2295

Sayers Six Reduced

CINCINNATI, Aug. 3—Following is the new reduced price list of the Sayers Six automobile:

	Old Price	New Price
Roadster	\$1,695	\$1,645
Phaeton	1,695	1,645
Coupe	2,795	2,645
Sedan	2,795	2,645

Hup and Dort Prices

DETROIT, Aug. 8—Revised price lists were announced today for the Hupmobile and the Dort cars, as follows:

	Old Price	New Price
Hupmobile—		
Phaeton	\$1250	\$1150
Roadster	1250	1150
Coupe	1,835	1,635
Sedan	1,935	1,785
Roadster coupe		1,335

Dort—	Old Price	New Price
Phaeton	\$ 885	\$ 885
Roadster	885	885
Coupe	1,315	1,350
Sedan	1,445	1,385
Small coupe	1,065	1,120
Small sedan	1,115	1,150

Competing Lines Maintain Positions

Gray Plans Production of 200 Cars Daily in 1923

Now Making 40 a Day at Detroit—to Open Plant Soon at Oakland, Cal.

DETROIT, Aug. 5—Gray Motor Co. will reach a production of 100 cars daily in its Detroit factory by Sept. 1 and is making preparations for the opening of a plant at Oakland, Cal., possibly by Oct. 1, in which it will produce an additional 50 daily. By January it is expected to have four assembly plants in operation, including Detroit and Oakland, the two later ones to provide for the Eastern market.

President F. L. Klingensmith said this week the company is now manufacturing 40 cars daily in Detroit and will reach 50 by Aug. 15. When 100 daily is reached that will be the maximum of the Detroit district. Production of 200 daily in all plants is planned for 1923.

A roadster will be added to the line in August which will have a detachable rear deck, permitting its instant change to a delivery vehicle. It will have a khaki top and will sell for about \$470, the price not being fixed definitely at this time. A four-door sedan will be added to the line later in the year.

The company is now opening up dealer territory west of the Mississippi, its sales to this time having been confined to eastern territory owing to limited production.

DURANT'S FIRST ANNIVERSARY

NEW YORK, Aug. 7—The anniversary of the first Durant year was celebrated last Friday. A year ago that day the first Durant car was placed on public exhibition in New York City. Since that time 30,000 Durants have been produced, of which number 14,755 came through the second quarter of 1922.

Today Durant products include the Durant Four, Durant Six, Star, Flint Six and Locomobile passenger cars and the Mason Read King, a truck. Durant plants have either been built or acquired in Oakland, Cal.; Muncie, Ind.; Lansing, Mich.; Flint, Mich.; Long Island City, N. Y.; Elizabeth, N. J.; Leaside (Toronto) Canada, and Bridgeport, Conn.

TIRE FRAUD REPORTED

NEW YORK, Aug. 7—The National Vigilance Committee of the Associated Advertising Clubs of the World reports a truck tire deception which is being practiced in some places in the east where unscrupulous dealers attempt to dispose of smooth tread tires by imitating new tread designs of standard makes.

Goodyear, United States, Firestone, Goodrich and Kelly-Springfield are the

makes that have suffered in this manner. Weather worn and deteriorated solid truck tires—some of them re-imported surplus stock of the American Expeditionary Forces in France—have been utilized. The registered designs of these standard makes have been imitated, the committee claims, by cutting into smooth tread tires with a pneumatic tool. These imitation treads are advertised, it is claimed, as first quality new tread tires and are not in any way guaranteed by the makers whose names they bear.

Police Nabbed Early User of Rubber Tires

BOSTON, Aug. 5—An effort is being made in Boston to get some authentic facts about George H. Miller, who equipped a buggy with rubber tires about 1850 and rode around Boston and Cambridge until stopped by the police. Miller lived in Hyde Park, now a portion of Boston, and when he had changed from steel to rubber and proceeded on his way the police decided that his contrivance was a nuisance and a menace to pedestrians, so he was ruled off the streets by the police of both cities.

37 Per Cent of Overlands Sold to First Car Owners

TOLEDO, O., Aug. 8—Fifty per cent of the June sales of Overlands, according to an analysis by company officials, were to former owners of Overlands, Fords or Chevrolets and 13 per cent were to owners of cars in the \$900 to \$1,250 class. It was found that 37 per cent of the sales for the month of June were to persons who never owned an automobile before.

135,000 CADILLAC EIGHTS

DETROIT, Aug. 8—Cadillac, during the month of July, passed the 135,000 mark in production of eight-cylinder V-type automobiles, according to A. U. Widman, manager of manufacturing.

"The production of the 'Eight' is now on the greatest schedule in the company's history," said Widman. "This total, of course, is in addition to the great previous production of four-cylinder and one-cylinder cars."

PARTS COMPANY ENJOINED

PROVIDENCE, R. I., Aug. 4—A temporary injunction restraining the Hudson Motor Specialties Co., of Philadelphia, from alleged unfair advertising and false representations concerning the Apco Manufacturing Co., of Providence, was granted by Federal Judge Arthur Brown, following the hearing of arguments.

Small Likelihood of Price War; Quantity Production Expected

Business Enough to Go Around and Leading Manufacturers Not Likely to Operate at Loss

NEW YORK, Aug. 8—Price cuts naturally are the chief topic of conversation in the industry at this time, but it is difficult to find anything especially alarming in the changes made. None of them is sensational and most of them have been made by highly competitive companies.

Revisions have been based on the reasonable expectation of a continuance of heavy production. They have been made possible by large output and a consequent lowering of overhead and manufacturing costs. The industry is again passing on to the consuming public the benefit of reduced production expense. This policy has had much to do with bringing the phenomenal business which the industry has enjoyed this year.

Encourages Farm Market

This will be one of the factors which will encourage a strong farm market. Farmers have felt for two years that they were having to pay exorbitant prices for the goods they needed while not getting fair prices for their own products. They have been convinced that automobile makers are playing fair with them and for that reason are in a mood to buy when they get enough cash to go into the market for something they don't actually have to get.

The price cuts may slow up sales for August, but they will not have a really demoralizing effect unless they are followed by a second series of cuts. Such a move is highly improbable, however. Manufacturers now have their prices down to such a level that they can't go on indefinitely making them lower if they expect to operate at a profit.

While competition will continue to be exceedingly sharp, there is small likelihood of anything resembling a price war. There seems to be enough business to go around and none of the companies proposes to operate at a loss. By increasing volume of production, they are cutting down their overhead and manufacturing costs sufficiently to offset any stiffening in material prices, except that which is of a temporary nature resulting from the mine and rail strikes.

Disregarding Chevrolet, which stands in a class by itself next to Ford, the keenest competition at this time is between Buick, Studebaker and Dodge. Close on their heels are Maxwell, Durant and the Nash, with Columbia, Oakland and Darr holding good positions.

(Continued on next page)

Ford Production of Enclosed Models Shows Great Increase

Present Rate Indicates It Will Be 25 Per Cent of Total Output for 1922

DETROIT, Aug. 7—For the first five months of 1922 the Ford Motor Co. reports an output of 103,048 enclosed cars—44,413 sedans and 58,635 coupes. Based on this production for five months, it is figured that the Ford company will turn out a total of 247,308 enclosed cars for the year, or 201 per cent greater than in 1919.

The demand for closed jobs is so great that the Ford company finds itself 100,000 behind in orders for this type, caused by inability to get the bodies fast enough. If this obstacle could be overcome, it is estimated by a Ford official that the sale of closed models for the year would be between 35 to 40 per cent of the total passenger car production, instead of about 25 per cent of the 1,000,000 passenger cars the company expects to turn out this year.

It is only this year that the demand for the coupe has exceeded that of the sedan. In 1919, of the 700,000 passenger cars produced by Ford, 35,771 were coupes and 48,318 sedans; in 1920, of the 977,000 passenger cars, 75,948 were coupes and 109,487 sedans. In 1921, of 875,000 production, there were 95,682 coupes and 129,887 sedans. Estimating the total production at 1,000,000 this year, it is figured that 140,724 will be coupes and 106,854 sedans.

In a percentage way 11.7 per cent of the passenger cars in 1919 was enclosed; in 1920 it was 18.9; in 1921, 25.7, while in 1922 it will be 24.7 per cent, it is estimated.

NEW LOCOMOBILE ORGANIZATION

NEW YORK, Aug. 4—Colonel E. H. Havens, one of the receivers for the old Locomobile Co., has been elected vice-president and general manager of the new Locomobile Co. of America.

D. G. Roos, formerly chief engineer, has been appointed production manager following the consolidation of the engineering and production departments.

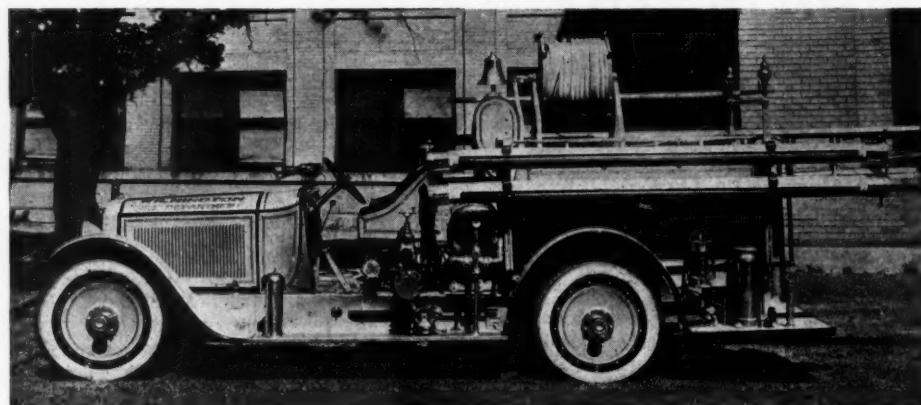
E. A. Travis, who has been in charge of the Locomobile branch in New York for the last two years, has been appointed general sales manager.

It is announced that the plant at Bridgeport will be remodeled and rearranged without production being retarded.

PIERCE-ARROW REDUCES DEFICIT

NEW YORK, Aug. 4—Pierce-Arrow Motor Car Co. for the three months ended June 30, 1922, reports a deficit, after interest and Federal taxes, of \$11,766, against \$1,400,550 for the same quarter in the previous year. The deficit for the first quarter of this year was \$25,226. Operating income for the period,

Complete Fire-Fighting Automobile Apparatus



DETROIT, July 15—A combination fire engine, hose cart and chemical machine has been successfully mounted on a Packard Twin six chassis, according to information received at the Packard factory from Minneapolis. The pumps are mounted under the driver's seat and

the water dome is set between the two halves of the divided front seat. The chemical tank is carried at the rear of the pump and a reel carries a line of small chemical hose above the water hose compartment at the rear. A tool compartment is also supplied.

after allowing for maintenance and depreciation, was \$348,855, against an operating loss of \$828,866 last year. Interest, Federal taxes and other charges aggregated \$360,621, against \$571,684. Operating income for the first half of this year totaled \$638,929 against the previous loss of \$989,060. Interest, taxes and other charges for the six months amounted to \$675,921, against \$900,922, leaving a deficit of \$36,992, against \$1,890,052 last year.

NEW TRUCK COMPANY

DETROIT, Aug. 5—United Motor Products has been incorporated in Grand Rapids to build two truck models, one weighing under one ton, the other from one to two tons. The officers of the company are F. T. Hulswit, president; Harry Green, vice-president in charge of finances, and G. R. Wilbur, vice-president and general manager. Hulswit is president of the United Light and Railway Co., Grand Rapids. Wilbur has been for the last eight years with the Republic and Ruggles companies. A. G. Boone, formerly chief engineer of the Ruggles company, will be in charge of manufacturing and engineering.

General Motors' Report Shows Increased Earnings

NEW YORK, Aug. 2—The financial statement of the General Motors Corp. for the first six months of 1922, ending June 30, has followed the preliminary statement issued two weeks ago. The formal statement does not vary much in essential details except that the auditors have discovered more net earnings on the common stock than was reported in the preliminary statement. The common's earnings for the first six months were reported at \$26,839,391; the formal statement places them at \$27,403,428.30.

CROSELMIRE HEADS BOARD

WASHINGTON, Aug. 7—F. A. Croselmire, vice-chairman of the A. A. A. contest board, which has charge of A. A. A. racing in the United States, has been appointed acting chairman of that board and will handle all matters pertaining to racing for the present.

William Schimpf, chairman of the board, has been forced to relinquish his duties for the present because of ill health and is now in the Adirondacks Mountains.

SMALL LIKELIHOOD OF PRICE WAR

(Continued from Preceding Page)

Buick led the race in the second quarter with Dodge less than 1,000 behind and Studebaker about 5,000 behind Dodge. Maxwell production in the second quarter was almost exactly half that of Buick. Durant and Nash were running neck and neck about 4,000 behind Maxwell with Durant less than 1,000 ahead of Nash. Columbia, with its new light six, is making an excellent showing and sales of Oakland are forging ahead. Overland, which is the closest price competitor of the light Chevrolet, made an excellent showing in the second quarter but turned out less than 45 per cent as many cars as its rival.

The following table shows the old and new prices where changes have been announced for the touring car and sedan of the lines which now are in the closest price competition:

	5-pass. Touring	Sedan	Old	New	Old	New
Buick 4.....	\$ 935	\$885	\$1395	\$1395		
Columbia Light Six	985	—	1395	—		
Dodge 4.....	880	—	1440	—		
Dort.....	885	—	1445	—		
Durant 4.....	890	—	1365	—		
Maxwell 4.....	885	—	1485	—		
Nash 4.....	985	935	1645	1545		
Oakland 6.....	1145	995	1785	1545		
Studebaker Light 6	1045	975	1750	1550		

Relative Value of Tractor and Horse Power Tested

Manufacturers Must Interest Owners in Operation to Displace Horses

TORONTO, Ont., Aug. 7—The conclusions reached as a result of an investigation by the Ontario College of Agriculture into the relative value of horse power and other forms of power on Ontario farms, are summarized in an article by Prof. W. C. Blackwood.

Prof. Blackwood's view is that if "efficient operators" can be found, the tractor proposition is on a safe basis. Owing to lack of these, many farmers, he finds, are reverting to horse power. There is food for thought for the tractor manufacturers in this statement. Prompt measures should be taken to see that the farmers who buy tractors, or their sons, are properly instructed in the running of the machine.

There is a real future for the tractor in Ontario, but it must be recognized that not every farmer can use one to advantage. The character of the farm and other conditions must be taken into consideration. To sell a tractor to a farmer who cannot use it profitably is to do the industry a poor service, Prof. Blackwood believes.

It is also poor business to sell a man a tractor without first seeing that he is familiar with its mechanism, and in a position to keep it running. An idle tractor is a poor advertisement for the manufacturer.

California County Supervisors Sound Battle Cry at Convention

LOS ANGELES, Aug. 5—The county supervisors of California undoubtedly sounded a battle-cry when, in convention at Eureka, their legislative committee reported in favor of 22,000 pounds as the gross maximum weight on state highways and the committee's report was adopted unanimously by the convention.

The county supervisors have absolutely no jurisdiction over the state highways, but in going on record for 22,000 pounds they threw down the gauntlet to truck owners and dealers, who are advocating a gross maximum limit of not less than 26,000 pounds. Undoubtedly this means a fight will be waged at next winter's session of the legislature.

OAKLAND OPEN HOUSE

PONTIAC, Mich., Aug. 5—Tuesday, Aug. 15, is to be a gala day at the Oakland Motor Car Co. plant, for on that day the whole county of Oakland, after which the car was named, is to be guests of the management in a factory tour.

The company has never had a general "open house" to the people of the home county, and the present management, under direction of George T. Hannum, president, and with the co-opera-

tion of the Pontiac Board of Commerce, Retail Merchants' Bureau and Oakland farm bureau, has arranged the occasion.

Preliminary work has been done by the co-operating organizations to bring in several thousand people from the county, all of whom will be guided through the plant while it is in operation.

Paces Car 20 Miles in Slow Speed Test

SIOUX CITY, Ia., Aug. 5—With the assistance of a trained athlete as a pace maker, J. M. White, of Sioux City, Iowa, recently gave a Wills Sainte Claire stock touring car a test that had a number of unique features.

White's purpose was to demonstrate the ability of the car to travel at slow speed while in high gear. The route selected was the road from Sioux City to Moville, a distance of 20.2 miles. Before the start, the Chief of Police sealed the transmission of the car. The town constable of Moville examined the car upon its arrival to see that the test was fairly made and a motorcycle officer acted as pilot.

The athlete who assisted in the test, Gus A. Carlson, walked the entire 20.2 miles beside the car, never once getting ahead of the front fender or behind the rear fender. His average speed was slightly better than three miles an hour, much of the distance being covered at a rate between two and two and one-half miles an hour. The return trip was made in 28 minutes.

MILLER TIRES REDUCED

AKRON, O., Aug. 7—A price reduction was announced this week by the Miller Rubber Co. The new prices are lower than ever before with reductions averaging 10 per cent on cords and 12½ per cent on fabrics.

The 30x3½ cord which was formerly \$24.75 and more recently \$18 is now \$15.95. There is another 30x3½ Miller cord at \$13.95 and still another—the new Wedge Tread—at \$12.50. The 32x4 cord formerly \$45.80, more recently \$32.40, is now \$29.15. The 35x5 cord during the war \$67.75, is now \$49.30. Fabric prices begin at \$9.

MISSISSIPPI VALLEY FAIR

ROCK ISLAND, Ill., Aug. 5—The Mississippi Valley fair and exposition, to be given near here Aug. 14 to 19, will be marked by an exhibit of motor vehicles. The Tri-Cities Automobile Dealers' Association, has endorsed the show and the fifty-seven exhibit spaces in the circus tent, have been spoken for. This tent has a length of 290 feet and a width of 140 feet. The displays will be composed of automobiles, trucks, tractors, and accessories. M. E. Bacon has been engaged as manager of the automotive show and has been busily engaged in making the preliminary arrangements.

300 Cars a Month Is Goal of American Steamer

Considers Location of a New Factory in Plant at Elgin, Ill.

CHICAGO, Aug. 5—Preparations for the manufacture of 300 cars a month are being made by the American Steam Truck Co. which is making its first public showing of its steam passenger car this week at the Chicago Pageant of Progress. R. R. Howard, president of the company, stated that the plant the company is now using at 500 Bloomingdale ave., is tooled up for the 300 a month production, but that it probably will be 90 days before that schedule is approached.

Production Limits Contracts

The present effort is directed toward the early completion of a group of 100 cars, most of which will be sent to dealers. The company has been conservative in making dealer contracts and has not attempted to get representation at any great distance from Chicago. Most of the territory in the states closely surrounding Chicago, however, has been contracted for, according to Howard.

The company has under consideration the location of its factory in a plant which it proposes to purchase in Elgin, Ill. Negotiations toward this move have been under way for some time but have not been completed. The plant under consideration was built for motor car production and has more than 22,000 square feet of manufacturing space.

June Sales of M. A. M. A. Nearly Double Those of a Year Ago

NEW YORK, Aug. 5—Sales by members of the Motor and Accessory Manufacturers Association for the first half of 1922 aggregated \$187,500,000 as compared with \$113,000,000 for the same period in 1921. Sales for June of this year were nearly double those of June, 1921. Business was almost on the same level as in May.

While business has been climbing upward there has been a sharp decrease in the volume of past due accounts. The total at the end of June, 1921, was \$4,270,000 and at the end of last June it was nearly \$2,840,000.

ASSEMBLE FORD IN 12 MINUTES

SALT LAKE CITY, Utah, Aug. 5—Teams from the Covey-Ballard Motor Co., local Ford and Lincoln car dealers, assembled a Ford car in full view of the audience at the Pantages Theater the other night. The feat was accomplished in 12 minutes and 15 seconds. The assembly included demountable rims and starter. The company offered a \$100 cash prize and a silver loving cup to the winning team.

Oregon Fordson Dealers Start Show on Tour

Farm Power Implements to Be Shown in Practical Demonstrations

PORLAND, Ore., Aug. 4—An unusual venture in merchandising power on the farm has been undertaken by the Ford dealers of Oregon in co-operation with implement and power appliance builders who have combined in staging a power exposition which is touring Oregon on a circuit that will keep it out for four months.

The complete show consists of 26 units self-propelled by means of Ford trucks and Fordson tractors, pulling trailers and trailmobiles.

In all the larger towns the caravan stops and stages demonstrations of the appliances which the caravan carries.

The idea has proven an immense success from the standpoint of attendance. All along the route which is advertised in advance people gathered at the cross roads to see the caravan going by. Wherever it stops it immediately becomes the center of attraction. From a business standpoint it has already more than paid its way.

The days are given over to field demonstrations of the tractors, plows and implements, while at night a radio outfit that brings in the concerts from the distant cities and motion pictures from the Ford plant, keep an intensely interested

crowd on the grounds until the Delco Light shuts down for the night.

The caravan is under the management of J. D. Jordan, assistant manager of the Portland Ford branch; C. E. Allison, State technical director; while C. M. Harrison represents the Oliver Plow Co.; W. D. Monroe the Standard Oil lubricating department; T. G. Musselman, the Delco Light Co., and H. B. Parsons, the Trailer Co. Co-operating in the venture is the Talbot-Casey Motor Car Co. of Portland, distributors for the trailmobile and builders of the Casey Tractor Wheels. These wheels make possible the use of the tractor in road work and are adaptable to the large size pneumatic tire of solid rubber or the block rubber tire.

Another interesting feature of the caravan is the Ersted tractor hoist. Delco light is used for the illumination of the exhibit at night.

Besides the power plants this company also features a complete electric kitchen and laundry which interests the farmer's wife exceedingly.

A Lincoln chassis is part of the show. With the caravan is Oregon's radio phenomenon, the 12-year-old son of H. J. Pollock, Ford dealer at Albany, Ore.

With a powerful regenerative outfit this young man successfully brought in stations from Canada and the middle west and allowed visitors to the caravan to enjoy music and lectures from points thousands of miles away.

After touring the Western Valley and Western Oregon, the caravan will finish up in Eastern Oregon and the grain country.

Oakland Shows Increase In Sales and Output During July

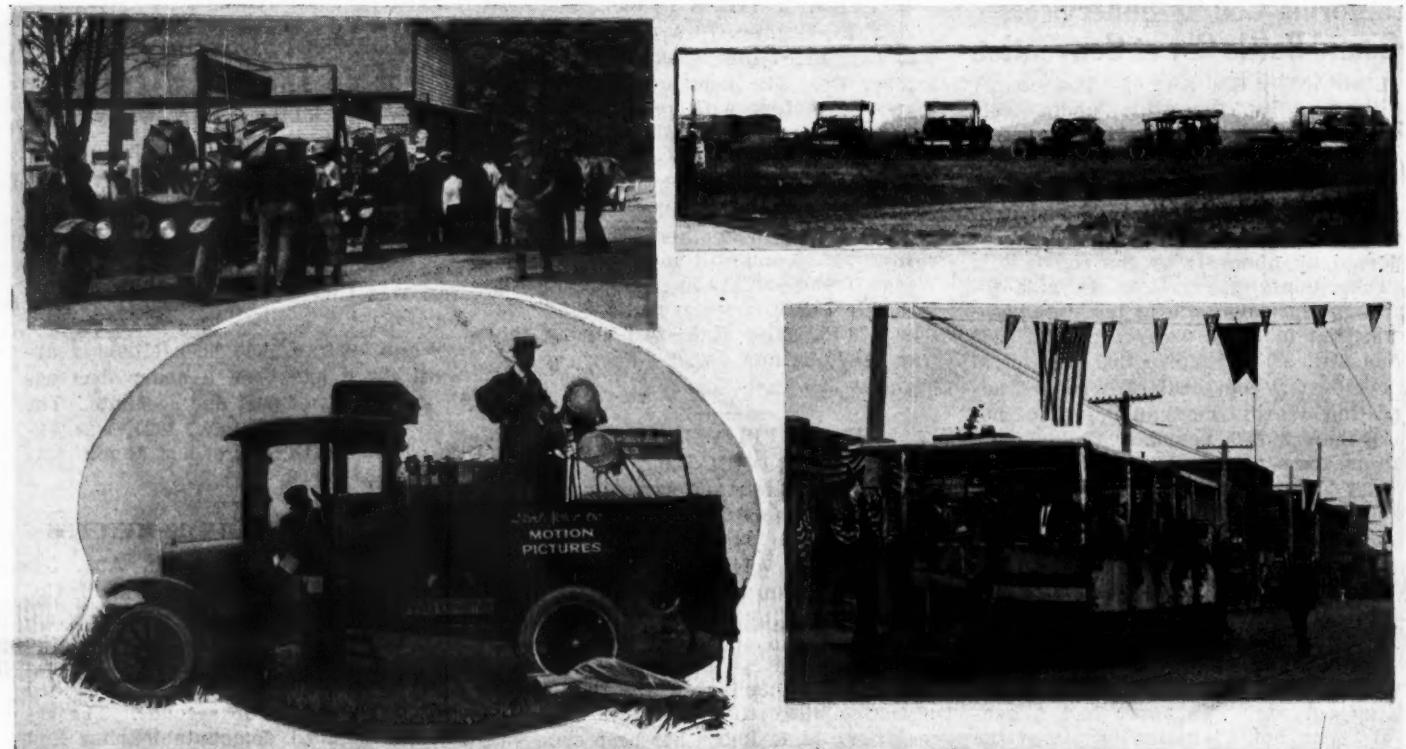
PONTIAC, Mich., Aug. 5—In spite of a general tendency downward in production in July in the automotive industry, the Oakland Motor Car Co. today announced it had shown an increase of output and of sales in that month. Compared with June, the output of the plant was 20 per cent higher, according to C. J. Nephler, general sales manager.

Present indications at the plant are that August and September will be the banner months of the year, in spite of the large increases made in June and July over earlier 1922 business.

The effect of the cut in prices announced as of Aug. 1 has been to create an oversold condition at the Oakland plant, according to W. R. Tracy, assistant sales manager. The reduction has stimulated sales heavily in territories where Oakland had previously been light, and it is evident from present indications that a large volume of farm business will be stirred up by the new models at the reduced prices.

BOSTON DEALER HELPS OWNERS

BOSTON, Aug. 4—Boston's narrow and crooked streets, with the many different ordinances governing parking and the various one way streets, have been such a problem for many motorists that the Jeffrey-Nichols Co. decided to help their customers to navigate the city. They had printed a map with all the data which they sent to owners.



Oregon's 4000-mile Tractor demonstration tour. Above, at right, the caravan of vehicles traveling across plains; at left, demonstration at a cross-roads. Below, at right, entering a gaily decorated town; at left, the movie man on the job.

Total Studebaker Sales Over \$73,000,000 for 6 Months

Company Declares Regular 1 3/4 Per Cent Dividend Payable Sept. 1

SOUTH BEND, Ind., Aug. 4—At their meeting here this week directors of the Studebaker Corp. declared the regular 1 3/4 per cent quarterly dividend on preferred stock and 4 per cent on common, payable Sept. 1 to stockholders of record at the close of business Aug. 10, 1922. The directors decided to put the common stock on a regular 10 per cent basis and to pay extra dividends as conditions permit, hence the 4 per cent declared today covers the 2 1/2 per cent regular quarterly dividend and a 1 1/2 per cent extra.

The total net sales of the Studebaker Corp. and subsidiary companies for the past six months ended June 30, amounted to \$73,422,862.25, and the net profits derived therefrom, with other net income, after reserves for increased depreciation but before income tax reserves, amounted to \$12,686,763.07. Reserves for United States and Canadian income taxes of \$1,530,362 reduced the net profits to \$11,156,401.07. These net profits exceed the net profits of the entire year of 1921, \$10,409,590.80, by 7.2 per cent and exceed also by 9.6 per cent the combined net profits of the first four years of the corporation's business 1911 to 1914 inclusive, which amounted to \$10,181,266.99.

President Erskine anticipates that the sales of the last six months of the year will approximate 75 per cent of the sales of the first six months. The company will enter 1923 well equipped to meet the expected keen competition. Additions to the South Bend plants and extensions of the plants in Detroit will give the company a production of 160 more cars per day than it now has. Then the combined plant capacity will be 600 cars a day or 150,000 per annum.

PAR-KAR CO. BUYS FACTORY

DETROIT, Aug. 4—The former plant and equipment of the Bellstrom Motors Co. at St. Louis, Mich., has been bought from the receiver by the Par-Kar Coach Co., which will make a special line of buses, complete with bodies. C. O. Westfall, president of the Par-Kar company, is well known as a transportation expert, having operated fleets of buses and trucks in many sections of the middle west.

LOS ANGELES TO HAVE SHOW

LOS ANGELES, Aug. 7—An automobile show will be held in Los Angeles this fall. The Motor Car Dealers' Association has decided on this and a committee has been appointed. There was a very pronounced demand among some of the dealers that a show be held last spring, but they lacked sufficient strength to influence enough others to put it across. Business has been remarkably

good and the show that more recently was proposed for one of the summer months will not materialize. It will be two years next winter since Los Angeles had a show, and feeling that the stimulating effect undoubtedly will be needed this fall, all of the forces will unite in favor of it.

State Parks and Forests Encourage Car Ownership

HARTFORD, CONN., Aug. 5—The state of Connecticut is now maintaining 25 parks comprising 5,121 acres and six state forests comprising 7,268 acres where motorists are always welcome. Nearly all of these reservations are natural lands comparatively untouched by human hand and containing shady forests, beautiful lakes, rushing water courses, tumbling falls and cataracts, mountain peaks and sandy beaches. One of the largest of these reservations is at Hammonasset, Madison, Conn., where the state has erected an immense bathing pavilion with ample facilities for the parking of cars, either in the free or paid sections. Average attendance at each on a hot day is 15,000. This reservation is distinctly a motoring proposition since it can be conveniently reached only by automobile. This tract comprises 552 acres.

ELGIN PLANS FULL OUTPUT

CHICAGO, Aug. 5—Full production by the Elgin Motor Car Corp. is planned for the remainder of this season, according to an announcement made by the officials of the company. Shipments of Elgin cars for the months of May, June and July were greater than those of any three months since the peak buying season of 1920, according to factory statements. The demand is said to be considerable in excess of the present factory output. Sales of enclosed models have exceeded the company's contemplated production and it has been necessary to change the schedule to provide for the larger production of enclosed cars.

BOOK ON HIGHWAY TRANSPORT

WASHINGTON, Aug. 7—Fundamental problems involved in highway transport and highway economics are discussed at length by leading students from engineering and automotive fields in a new booklet now ready for distribution by the Highway Education Board.

Modification of truck design to fit the road, subsidizing of highway transport by the construction of market lanes, predictions of future traffic changes, and economical types of roads are only four of nearly two score problems raised and discussed authoritatively in the bulletin.

The bulletin is being distributed by the Highway Education Board, Willard Building, Washington.

August Shows Signs of Being Better Than July

Chicago Dealers and Distributors Confident That Sales Will Increase

CHICAGO, Aug. 7—With price reductions in a number of leading lines being prominently announced, Chicago automobile distributors and dealers are making August sales at a rate which indicates this month's business will be slightly better than that of July. The volume of sales last month fell somewhat below the high point reached in June but there was nothing like a slump. August is expected to reach a level between the June and July figures, and there is confidence that September and October will bring another period of unusually active selling.

Motors Save Tie-up

A strike of street car and elevated railway trainmen which began Aug. 1 and continued six days gave the automobile industry a lot of favorable advertising on account of the excellent manner in which motor vehicle transportation is serving the city, but did not materially aid the sale of automobiles. The 200,000 motor vehicles in the city appear to have been adequate for the emergency and there seems to be no unusual inclination of prospective purchasers to close deals in view of the unsettled conditions.

A number of sales of used cars and trucks were undoubtedly traceable directly to the street car strike, but on the other hand there were actually fewer prospective purchasers visiting the sales rooms than in normal times. Maintenance business has improved somewhat and the sale of gasoline has increased from 600,000 to 1,000,000 gallons a day, indicating a two-thirds increase in the use of motor vehicles.

Trade-ins Selling Readily

Most of the car sales that would be made normally are being made, the dealers handling the popular well-established line continuing to hold their lead. Deliveries are still slow in some of the leading lines in all price classifications. New car dealers are finding ready sale for the used cars they take in trade, but the exclusive used car dealers are finding business somewhat slow.

Time sales of new and used cars in Cook County, including Chicago, for the four weeks ending July 29, were 3,990 as compared with 4,280 for the four weeks ending July 1, according to figures compiled by the Central Automobile Finance Association.

The Chicago dealers, under the auspices of the Chicago Automobile Trade Association, are exhibiting the latest models of their respective lines at the Pageant of Progress, to close Aug. 20, attendance at which has been greatly restricted on account of the street car strike.

July Production Running But Little Under Spring Record

Price Reductions Now May Put Off Buying Until Next Show Period

DETROIT, Aug. 7.—With production in July running just seasonably under the three record breaking spring months, factories in the Detroit district are entering the month of August with considerable anxiety as to the effect of price reductions on the automobile market. In the opinion of many the reductions at this time will have the effect of causing a general holding off of buying which may continue into September and may run through to the next show period.

Going into August practically every factory had a large number of orders ahead and was assured of operation on a nearly capacity scale. There is little hesitation however, in saying that these orders are subject to heavy reduction under the influence of a price raid, and officials are keeping in very close touch with the situation so that schedules may be quickly altered to meet the changed conditions.

There is a seeming tendency on the part of a majority of factories to hold off on price reductions until the effect of the early ones has been considered. Many factories would undoubtedly prefer to maintain their present price positions if it is possible to do it without the sacrifice of their production positions. This situation will not clear itself before the first ten days of the month and meanwhile the industry will be in very unsettled condition.

Ford in July came through with another record month, the production exceeding the 151,000 figure fixed and August schedules have been fixed at approximately the same level.

Ford domestic sales ran at approximately 135,000 cars and trucks and 10,000 tractors. Tractors showed a slight falling off. With the foreign sales it was said the total would exceed the 151,000 schedule fixed for the month. Dodge operated at close to its 600 a day schedule for the month, piling up orders on its new utility coupe several months in advance of production facilities.

Maxwell operation was at about 50 per cent of its June total owing to manufacturing changes at the plant which are rapidly being perfected and will permit the company to resume on a schedule of about 300 daily. The Durant Lansing factory bettered its production of 100 daily on the Durant fours and will begin manufacture this month of the Star in addition to the usual total of Durants. Dort continues on a schedule of 50 to 70 daily.

Buick with its completely revised line has set a schedule of 185,000 for the year, a monthly total of about 15,500. This total can easily be reached with the additional facilities afforded by the former Scripps-Booth plant, which is to be the

enclosed car unit of the company. Under pressure the company can build about 800 cars a day in its Detroit and Flint factories.

Studebaker is continuing at its capacity of 440 daily, having maintained this rate since early in February. Hudson-Essex operated at the rate of 285 daily in July and plans to continue this figure in August. Hudson reports that its sedan is practically sold out for the balance of the year. The demand for its coach models continues to be a feature of its business.

Paige came through July with an output in both Paige and Jewett models of about 140 daily. Hupp totals for the month maintained its 140 daily rate. Columbia has increased its August total to 2,000, after building about 1,650 in July.

Oldsmobile maintained a schedule of about 100 daily through July and similar totals were reached at the Oakland plant.

Chevrolet totals kept close to the 1,000 daily mark reached by the company in the earlier months. Reo resumed operation in July after a two weeks general vacation period at a daily rate of about 100 cars and Speed Wagons. Liberty continued on its schedule of 30 to 35 daily and Rickenbacker continued its 25 daily total.

Companies producing cars in the higher priced field are continuing heavy production. Cadillac with about 100 daily, is working at capacity, as is Lincoln with a daily output of 30 to 35. Packard total production continues on the 2,000 monthly schedule, the single six being sold through to early fall. Wills Ste. Claire is planning to add to its schedule of 25 daily.

Spikes for Heedless Drivers

CLARKSBURG, Mass., Aug. 5.—Attempts by motorists to speed through the town of Clarksburg are literally spiked by the vigilant night police force. When one officer sees a car coming along at too high speed he steps out on the thoroughfare and waves a red lantern. If the motorist slows down he is warned to proceed more carefully.

If, however, he races along heedlessly he hears a whistle. Shortly thereafter he goes bump, bump, and there follow a few air explosions. A second officer, on hearing the whistle, has laid down a plank with a number of spikes close together. And the motorist has not time to swerve, so he rolls over the spikes with sad results.

RECEIVER FOR CHAIN STORES

COLUMBUS, O., Aug. 4.—Upon the application of W. A. Breisacher, president and treasurer of the United Auto Stores Co., Judge Kinkead has named Oliver H. Perry as receiver. The company has been conducting retail stores in Zanesville, Cambridge, Delaware and Sidney. Stocks on hand are appraised at \$20,000.

Coal and Rail Strikes Hurt Accessories and Parts Sales

More Serious Injury Probable If Settlement Is Not Soon Reached

CHICAGO, Aug. 5.—The coal and railroad shopmen's strikes have hurt the business of automobile parts and accessories manufacturers in Chicago and threaten to do it much more serious injury unless a settlement is reached soon.

According to W. E. Greene, secretary of the Association of Automotive Equipment Manufacturers, there has been in the last three weeks a substantial decline in the volume of orders coming to the Chicago firms. He believes this is due principally to hesitancy by customers to buy under the prevailing unsettled industrial conditions.

Some manufacturers also have been hampered by the slow delivery of materials, especially steel. Instances were cited of steel orders being four weeks on the way, which is very unusual. The local street car strike, which has completely tied up the cars, also has added to the troubles of the manufacturers.

The local coal supply also is getting short and, according to John M. Glenn, secretary of the Illinois Manufacturers' Assn., the reserve of many manufacturers in Chicago will be exhausted within a few days. The situation is much more serious than the general public has realized, he said. The state fuel director under the new Federal control has been notified that Illinois will not be permitted to obtain coal from other states. In view of the absolute union domination of coal mining in this state, this means a fuel famine throughout Illinois unless there is a prompt settlement by which the union miners will return to work.

The depletion of fuel reserves is so complete, according to Glenn, that if mining is resumed it will be several months before the industries can be fully supplied with coal to the extent of their needs.

ELECTRIC SERVICE ASSN. GROWS

DETROIT, Aug. 4.—Backed by the efforts of the manufacturers of starting, lighting and ignition equipment, who have pointed out to their service representatives the value of membership in the Automotive Electric Service Association, the membership in that organization has grown from 62 at the annual meeting Jan. 31 to approximately 230 on July 1.

The midsummer meeting of the governors of the association will be held in Detroit, Aug. 11, at which time recommendations will be made for the consideration of the manufacturers at their summer meeting at Old Orchard, Me., Aug. 31.

General Motors Truck Production for July Rivals June

Output Kept In Close Tune to the Sales of Retail Agents, Says Day

PONTIAC, Mich., Aug. 5—July production of motor trucks in the General Motors truck plant here was very close to that in June, which was a record month since the days of war production, according to W. L. Day, general manager of the plant.

"We keep our output in close tune with the sales of our retail agencies," he said, "and for that reason we are not in a position to say how many trucks we are going to turn out in August. That is governed by the sales, and under our system of keeping in touch with the agents we are able to regulate our factory operations very close to the demand. But if the advance indications are any criterion, we will have about as big an August business as we had in July. This in spite of the fact that August is normally a dull truck month."

Business on the three new truck tractor models put out by the company some weeks ago for heavy haulage purposes is remarkably good, Day said. The G M C models in this line have met with a ready response from contractors and others having need for a particularly sturdy machine capable of hauling unusually heavy loads without damage to highways.

LARGE COLUMBUS SHOW PLANNED

COLUMBUS, O., Aug. 7—Plans for the fall automobile show to be given at the Ohio State Fair Grounds, Aug. 28 to Sept. 2 are now completed and assurances are given that a larger number of makes than ever before will be displayed. The show is to be given by the Columbus Automobile Dealers' Co., which has been incorporated. All local dealers as well as many outside factories will have space at the show. Trucks will be shown either in a separate building or under tents provided for that purpose. A. B. Coares is manager of the show.

I. H. C. TRUCK OUTPUT

SPRINGFIELD, O., Aug. 7—Shipments of motor trucks from the Springfield works of The International Harvester Co. are going forward at the rate of 25 a day, according to Superintendent Charles H. Smart. There has been no interference by the strike on inbound shipments of material, Smart said. Outbound shipments are going forward, so far as he knows. At least no complaints have been received at the local works. A. E. Jones, assistant works manager, and J. H. Durr, chief engineer of The International Harvester Company, were in the city recently conferring with Smart and inspecting conditions at the plant.

Good sized orders are coming in at the

plant of the Kelly-Springfield Motor Truck Co. Shipments are going forward rapidly, it is announced. General Manager F. H. Peitsch is in New York City and other points in the East on a business trip.

Stephens Motor Car Co. Incorporation Now Complete

FREEPORT, Ill., Aug. 5—Announcement is made of the completion of the incorporation of the Stephens Motor Car Co. There is now a separate and entirely new company instead of the old organization which was simply a branch of the Moline Plow Co., but it will remain subsidiary to the parent company, although a distinct unit in the motor car industry.

Officers have been elected as follows: President, G. N. Peek; first vice-president, H. S. Johnson; second vice-president, R. W. Lea; third vice-president, H. J. Leonard; fourth vice-president, O. P. Robb; secretary, L. C. Shents; assistant secretary, James Mullen; assistant treasurer, F. J. Hoenigmann. The directors include G. N. Peek, president of the Moline Plow Co.; H. S. Johnson, vice-president of the Moline Plow Co.; R. W. Lea, vice-president of the Moline Plow Co.; F. D. Wetmore, president First National Bank of Chicago; Herman Waldeck, vice-president of the Continental and Commercial National Bank, Chicago; C. P. Coffin; credit manager Illinois Steel Co., Chicago; C. T. Jaffray, president First National Bank, Minneapolis, Minn., and S. A. Mitchell, counsel Mercantile Trust Co., St. Louis.

H. J. Leonard, who has been general manager for a number of years, has been made a vice-president and placed in charge of production, with headquarters in Freeport. Commencing with Aug. 1, the sales department is located in Moline, Ill., under the supervision of Vice-President R. W. Lea. However, the factories and all of the production activities, including accounting service and many other features will remain in Freeport under the direction of Leonard. Vice-President O. P. Robb has been appointed sales manager with headquarters in Moline. He succeeds C. R. Cough who recently resigned.

TEST DISTRIBUTOR TAX

CHARLOTTE, N. C., Aug. 4.—The North Carolina license tax of \$500 on automobile distributors is again being contested, it is learned here. It was announced in the last meeting of the local automotive trade association that the General Motors Truck Corporation is preparing a test case to fight the tax. Originally the North Carolina law exempted automobile manufacturing companies in the state from this tax. Payment was contested and the law held invalid because of the discrimination between the home product and the outside product. The next legislature amended the law, making it applicable alike to all.

GOOD DEMAND IN PHILADELPHIA

PHILADELPHIA, Aug. 5—Automobile dealers here report a general demand for all types of cars, with enclosed models having the preference.

Ryan's Stutz Stock Sold at Public Auction at \$20

Guaranty Trust Co. Buys Out Interests of Bankrupt Man In Sale

NEW YORK, Aug. 5—Efforts on the part of Receiver Caffey to force the banks to offer Allan A. Ryan's Stutz stock at private sale having failed, the original plan of selling the securities at auction was followed. The holdings of the bankrupt financier were put on the block and were bought in at \$20 a share by the Guaranty Trust Co., which purchased all but 1500 of the 134,414 1/3 shares that were offered, the sale of the Stutz property bringing a total of \$2,686,286.06. The odd block of 1500 shares went to the Empire Trust Co. for \$30,000.

The Guaranty Trust Co., prior to the bankruptcy proceedings, held the big majority of Stutz stock which had been put up as collateral by Ryan. After the failure the bank announced it would protect itself by means of the auction block, an action which was participated in also by several other banks which held smaller blocks of Stutz stock. Inasmuch as this stock carried with it control of the Stutz company and the last financial report of the company showed it to be a going concern and prospering, interest in the sale was keen.

As yet the Guaranty Trust Co. has not decided what the next step will be. It is felt that the bankers will retain control and take steps immediately to increase production and sales. If this is not done, in all likelihood there will be a public offering of the shares. A definite decision will not be made until the bank has studied the situation.

THREE SHOWS FOR RICHMOND

RICHMOND, Va., Aug. 7—Richmond is to have three automobile shows this year, according to statements of prominent automobile dealers in the city affiliated with the Richmond Automotive Association. For the first time in the history of the city there will be an enclosed car show this fall, with about 25 dealers taking part.

The matter has just been taken up with the Automotive Trade Association, which is expected to lend its support to the movement. The date for the show, although not officially fixed, probably will be Sept. 25 to 30.

The second show will be during the Virginia State Fair, more than a city block of space having been taken up and leased by truck and tractor dealers for the occasion. Some few passenger cars will be in the show, which is being staged by private interests and is not a concentrated entertainment arranged by all dealers.

The third show of the season will be held directly following the New York Show in January.

'How Many First Time Buyers?' Answers Come From West Coast

Oregon, California and Washington Report "Cash From the Sock" Sales

ST. LOUIS, Mo., Aug. 5—Print of the bed springs on greenbacks, rust from old tin cans and mould on money that has been used in purchase of motor vehicles in Boise, Idaho indicate the source from which has come the funds for the unusually high percentage of cash motor vehicle sales since Jan. 1. One car was sold in Boise for gold. Banking chaos which hit Idaho some months ago evidently sent the workers to their stockings, and other hoarding places.

The stories of this kind of money come from all parts of the Rocky Mountains and the northwest and the Pacific coast. They come in response to that question which was asked two months ago in the Gulf states, the Atlantic states and the Blue Ridge states:

How many first time buyers?

The information that was checkable in the territory through which this question has been repeated since May 25 is quite interesting. In western Texas the first time buyers were about five per cent. In Phoenix, Ariz. it ran as high as 20 per cent for all lines but in one particular line went beyond 40 per cent. In San Diego, Los Angeles, San Francisco, and inland counties of California the percentage was low. It would average less than five per cent for the whole state. In San Francisco one dealer handling a product selling above \$1,500 had made only one clean sale this year. It was not to a "first timer."

California dealers say their conditions are different. That almost everyone who comes into the state has been or is an owner of a motor vehicle. This condition seemed to be reflected in northern California.

In Oregon the percentages began increasing. In Eugene it would average 10 per cent. In Astoria, Salem, Albany, Medford it would average about 15 per cent.

Washington also showed an increase. In one Washington city the sales record for a \$1,000 car was checked carefully. Seven weeks were picked at random, beginning with March 4. It showed:

First time buyers	Total sales
First week	2
Second week	7
Third week	7
Fourth week	6
Fifth week	5
Sixth week	2
Seventh week	6
Total	35
	62

Seattle figures indicated about 27 per cent were first time buyers. Running down through Pocatello, Twin Falls, Boise in Idaho the percentages ran from 20 to 30 and even 45 per cent. In Idaho and Washington the percentage of cash sales was asserted to be about 50 per cent of all sales.

In the one city in which the foregoing figures were tabulated the dealers have been developing intensive methods of prospect hunting. They have felt that there were innumerable persons who could buy and would, if found.

The coast dealers say they have had no depression and very little experience of the tough months that have hardened the dealers in the central and eastern states.

Lack of cars for delivery is still prominent in the west and northwest. It is as bad here as it was in the south and southeast and central parts.

Break up of dealer organizations has been noted in Washington, Oregon and Idaho thus far. Banking accommodations again are found to be one of the reasons for the small proportions of the dealer organizations. Mortality has not been so high in percentage among the dealers as it has in numbers. And to re-establish some of the dealer organizations will be a task in the eastern Rocky Mountains and northern districts of that range because of bank conditions. Finance companies are also making things difficult for some of the work of building dealer organizations. Some have indicated that unless various states enact laws requiring compulsory recording of title notes and sales contracts they will withdraw from those states. This the dealers claim would be a sales resistance but see not how to avoid it.

Despite all of these things there is an apparent cheerful attitude in general and a feeling of hopefulness that the automobile industry is settling down to a healthy condition. What the future will bring in keen competition is not creating any great worry but there seems to be a spirit of desire to get down to a rock bottom basis of sane operating practices that will permit a steady program of sales activity on a minimum of cost and a maximum of results.

NEW R. & L. CABS IN PRODUCTION

CHICOPEE FALLS, Mass., Aug. 5—A gasoline-engined taxicab to be known as the R. & L. cab is now being produced by Rauch & Lang, Inc., well-known as manufacturers of electric vehicles. At the present time 25 of these cabs are going through the factory and plans have been made to manufacture 250 of these vehicles at the rate of 50 a month beginning in September. Two body styles are offered, one a limousine at \$2,350 and the other a limousine-landaulet at \$2,475.

NEW INDIAN PRICE LIST

SPRINGFIELD, Mass., Aug. 5—The Hendee Manufacturing Co. announces a new schedule of prices on the Indian motorcycle. The prices are as follows:

	Old Price	New Price
Scout (non elec.)	\$315	\$250
Scout (elec.)	345	285
Standard (non elec.)	335	275
Standard (elec.)	370	310
Chief (elec.)	435	325

100 Per Cent Increase in Service Station Business

Better Farm Conditions Also Result in More Automobile Sales in Southeast

ATLANTA, Ga., Aug. 7—A survey of automotive sales conditions over the southeast as evidenced by reports of Atlanta distributors handling this territory, evidences the fact that business has proven entirely satisfactory since the early spring, and that there has been a steady improvement from week to week to the present time in the sale of both new and used cars and trucks. The latter business has been especially satisfactory as compared with the slack in truck sales the industry experienced a year ago, and the outlook now is for increased truck demand in every line of business.

With cotton prices holding steady around a figure that insures the grower a fair margin of profit, there is a much better feeling among the farmers. Furthermore, other farm prices are satisfactory and financially the southeastern farmer is in a better shape than he has been in more than two years. This is resulting in improved truck and tractor sales among the smaller dealers, and a pick-up also in other automotive sales.

As compared with one year ago registration of trucks and cars at the state capital here during the first seven months of this year increased materially, further evidence of the improvement in sales.

Accessory business, dealers and jobbers here advise, including tires, has been in greater volume the past two or three months than at any time within the past two years. Collections also are materially better and now very close to normal once more.

Service station business is perhaps 90 to 100 per cent better than a year ago, with no promise of a let-up at any near future date.

FINANCING PROMOTERS INDICTED

PHILADELPHIA, Aug. 4—Criminal prosecution, following closely hearings before the civil courts, of Franklin Spiese, promoter of the National Guarantee Corporation, and his associates and fellow officers in the corporation, whose business it was to provide for the financing of automobile, motor truck and tractor purchases, was begun when the grand jury returned an indictment charging Spiese, William E. Hubbard, Charles G. Gartling, an attorney; Andrew M. Flannigan, Frank A. Rowcroft and Charles E. Gabriel with conspiracy to cheat and defraud the public to the extent of \$1,000,000. Also, they are charged with cheating and defrauding the corporation of \$200,000 and with the fraudulent conversion to their own uses of an additional \$200,000.

BUSINESS NOTES

Officials of the Western Reserve Cotton Mills Co. of Georgia, subsidiary organization of the Mason Tire & Rubber Co., Kent, O., advise that the plant has ordered several thousand dollars worth of new weaving machinery and that when installed the weaving capacity of the mills will be greatly increased. Evidence of good business in tire sales is indicated by the fact that the mills are operating day and night shifts at full capacity, manufacturing tire fabric exclusively.

Fire at Atlanta, Ga., believed to have been started by burglars, entirely destroyed the service station of the Southern Dorris Co., the plant of the Jenkins Vulcanizing Co., and the service station of Hargrave Brothers, including more than 150 automobiles and trucks in the three buildings. The Dorris company suffered the heaviest loss, amounting to about \$150,000 for the cars alone and about \$50,000 to the building.

The plant of the Ericsson Manufacturing Co., 1100 Military Road, Buffalo, where Bosch magneto were made, was sold for \$250,000 to Edward L. Jellinek at public auction, under orders from the United States district court. The sale included the entire plant with all its equipment and accessories. It is understood that Jellinek was acting in the interests of the Swedish stockholders of the company. The sale is subject to confirmation by the court.

Master Tire & Equipment Co. has been organized at Moline, Ill., and has installed machinery and equipment in the building at 1919-21 Second avenue for the manufacture of vulcanizing and tire repair machinery, including a full circle steam chamber tire mould for which a new field is said to be developing. The company plans to install a tire and rubber plant in the near future and an output of 400 to 600 tires daily is planned. The plant just leased was formerly occupied by the Moline Engineering Co., and will, it is believed, answer admirably for the purpose of the new company following some minor alterations.

Clover Leaf Motor Co. has been organized at Cicero, Ill., and has opened a garage and sales agency at 5203 West 25th street. Capital stock has been fixed at \$9,000. The promoters are R. E. Sloan, D. J. Bradley and J. H. Buck.

Elmer Vinkler, Forrest, Ill., has purchased the garage and service station of J. E. Farney and will distribute the Ford car in that territory.

Auto Lock Sales Co., Minneapolis, has been authorized with capital limit of \$50,000. The incorporators are Harol C. Howard, Donald L. Pomeroy and Henry F. Pomeroy.

Metal Products Co. of Minneapolis is a new concern with authorized capital of \$50,000, formed by Valda S. Kidd, Walter S. Graves and A. Henry Anderson.

Wills Sainte Claire Company of Minneapolis has been incorporated at \$50,000 by W. H. Schmelzel, the present representative of the car; E. E. Rockhill and Paul F. Foit, all of St. Paul.

J. H. Whittington, Jr., for five years head salesman for T. K. Hays, Buick distributor at Bloomington, Ill., has resigned and has formed a partnership with Frank Dalton to open a new motor car agency in that city. They have leased the building at 404 West Washington street and, early in August, will open for business. They have secured the distribution of the Rickenbacker car for central Illinois, the first time that this car has been introduced in that section. The sales room has been handsomely furnished and the new firm will operate a service station in addition to the sales agency.

The Boyd Motor Co. has been organized and incorporated at Dyersburg, Tenn., with \$10,000

capital, and will enter the general automobile agency field. Incorporators are James W. Boyd, D. L. Craig, C. O. Brawley, Elva M. Boyd and Mrs. D. L. Craig.

T. J. Meadows and E. M. Cochran, of Columbus, Ga., have organized the Cochran and Meadows Co., in that city, and have opened a new store there, handling automobile accessories.

The Pless Motor Co., of Knoxville, Tenn., has moved into its new \$30,000 service station at 712 North Broadway. The company handles the sale only of used cars, and display rooms are also provided in the new building.

A. Wahnish, A. C. Spiller and George V. Stein, all of Tallahassee, Fla., have organized there the Hill City Manufacturing Co., and obtained a building where machinery is now being installed for the manufacture of automobile rims. Operations are expected to begin at the plant within another month.

White Bear Auto Transit Co. of White Bear, Minn., suburban to St. Paul, has been organized. The authorized capital is \$50,000. Incorporators are J. Y. Clark, C. C. Lauer, Roland La Fond and Carl Anderson.

Automobile firm of Pomeroy-Kennedy Co. of Minneapolis has an authorized capital limit of \$50,000 in its new incorporation charter. Emery F. Pomeroy, Harry F. Kennedy and Donald L. Pomeroy are the incorporators.

Universal Motor Sales Corp., Richmond, Va., is preparing for a tractor demonstration to take place the latter part of August.

Myers & Renner Co., Cincinnati, Ohio, has been chartered with a capital of \$25,000 to deal in auto accessories both wholesale and retail. The place of business is at 1308 Vine street. Incorporators are Robert C. Braus, E. C. Myers, George Renner, Herman F. Siegel and George Sales.

Seneca Piston Ring Co., Lorain, Ohio, has been chartered with a capital of \$25,000. Incorporators are John H. Davis, Frank J. Martin, Thomas McGrath, W. S. Baldwin and R. B. Miller.

C. E. Auto Parts Manufacturing Co., Cleveland, Ohio, has been chartered with a capital of \$10,000 to manufacture accessories. The place of business is at 5516 Euclid avenue. Incorporators are A. J. O'Brien, O. C. O'Brien, Mrs. Carrie O'Brien, S. E. Gates and B. E. Cuddy.

Springfield, Ill., Automobile Dealers' Assn., contributed \$150 towards a fund of \$5000 asked of business men and citizens, to properly equip the state arsenal building for sheltering the local units of the state militia and also improving the stables and hospital at Camp Lincoln.

Ground has been broken for a new garage and sales agency on West Main street, Galesburg, Ill., which will be occupied by the Christy-Hudson Motor Co., as a sales agency, distributing the Hudson car, and the service and motor vehicle repair firm of Mulvaney & Johnson. The plant has a frontage of 82 ft. and a depth of 157 and will be of two stories. The contractor hopes to have the structure ready for occupancy in October or November.

J. B. Harris and George E. Koehn, Springfield, Ill., have formed a partnership and will distribute the National and Davis motor cars in the Sangamon county territory. A show room and service station has been opened at 315-317 East Washington street.

Frank Germ and Frank Whiting, Streator, Ill., have formed a partnership, and will distribute the Hupmobile in the LaSalle county territory. The former has been conducting a garage and repair shop for many years, and, with a partner, will conduct a sales agency.

same capacity with the Star company, while Secretary H. F. Herbermann of Durant Motors will have the same title with Star.

Star common will be placed on the market for the first time on Aug. 10. It will be listed at \$15 a share and sold in lots of from five to 50 under the Durant plan—no cash transactions but a monthly installment system. It has not been announced as yet how many shares will be offered at the start but it is expected the Star will have 50,000 shareholders before the end of the sale.

Railroad Strike Situation Aids Car and Truck Sales

Boston Business Men Make Inquiries About Trucks and Bodies

BOSTON, July 31—Some of the Boston car and truck distributors have noticed in the past few days that the strike has started people making inquiries about the possibilities of getting motor vehicles quickly if necessary. In talking with dealers some of those looking for cars have seemed to figure out that in case the railroad strike grows worse, and food commodities may be a bit curtailed, it would not be a bad plan to own machines to go foraging. And one fellow plainly told a distributor that he was going to buy a car and motor down South for the Winter with his family where he would not be troubled with cold weather with wood enough around to keep warm.

Business men have been inquiring about trucks. Some of the newspaper people want to be prepared to send out their deliveries in case it is necessary due to the railroad situation. And other firms, which in war times used trucks exclusively, but later went back to the railroads with their shipments, are again turning their eyes to trucks. Truck salesmen are taking advantage of this and sending out letters to business firms advising them what they should do to be prepared for emergencies.

TO CHECK AUTOMOBILE THEFTS

HOUSTON, Tex., Aug. 5—The Houston Auto Trades Association has perfected a new scheme for aiding in suppressing the traffic in stolen cars. The association has long been receiving reports of its members on second hand cars bought and sold, especially sold, and now the association will receive immediate reports through its members to its secretary of any second hand cars being offered at very cheap prices or any suspicious action shown by the persons offering cars for sale. These things will be reported to the police immediately. In case the police get on the scene too late the association has a description of the car offered, and furnishes this to all members. The association believes it will soon reduce the car thefts and stolen car traffic in Houston and south Texas.

ATLANTA TRADE ELECTION

ATLANTA, Ga., Aug. 4—Fred G. Tegder, head of the E. M. Thomas Auto Top & Manufacturing Co., was elected president of the Atlanta Automotive Equipment Association at the annual meeting here. Lon Credelle was elected vice-president, E. H. Elleby was re-elected secretary, and C. V. Hohenstein will continue as executive secretary. The membership now includes 48 firms in the equipment field in Atlanta.

DOWNES HEADS STAR MOTORS

NEW YORK, Aug. 5—Carroll Downes, vice-president of Durant Motors, Inc., and president and general manager of the Durant Motor Co. of Michigan, has been named by W. C. Durant as president and general manager of Star Motors, Inc., the personnel of which has just been announced. C. F. Daly, who also is assistant to the president of Durant Motors, has been selected as vice-president of Star. W. W. Murphy, treasurer of Durant Motors, will serve in the

CONCERNING MEN YOU KNOW

H. G. Blakeslee has been appointed by the Splitdorf Electrical Co., of Newark, N. J., as sales and service engineer for the southern territory, with headquarters with the Automotive Sales & Service Co., Splitdorf distributors in Atlanta.

Samuel H. Carpenter, president and general manager of the Atlas Drop Forge Co., Lansing, Mich., died suddenly last week. Although Mr. Carpenter had been ill for a time lately, he had appeared to be improving in health. When the forge company was formed in 1906 Mr. Carpenter was general manager and three years ago he assumed the presidency. He also was a director of the Federal Drop Forge Co.

Charles Phillips has been appointed sales manager of the Phillips-Chapman Co. of Nashville. He is one of the pioneer automotive equipment men in Nashville.

David Grody, president of the Syracuse Automobile Dealers' Assn., has sold his interest in the Syracuse Motor Car Co. at 312 West Genesee street, and on Aug. 1 will take over the control of the Berkshire Motor Car Co. of Albany. Mr. Grody sold to his partner, Simon J. Silverman. Both men were also interested in the Berkshire Company of Albany.

George Thurman, until recently associated with the Automotive Electric Equipment Co., Pontiac, Mich., and prior to that with the Oakland Motor Car Co., has gone to Cleveland to engage in the insurance business with a brother.

Carl H. Felton, of Pontiac, Mich., formerly secretary of the Maxwell-Chalmers Co., and recently city attorney of Pontiac, is a member of the Felton Piston Ring Company, formed this week to manufacture a new piston ring to take care of .035 over-width and .040 over-diameter. The other members of the company are Charles H. Felton, recently with Timken-Detroit Axle Company, and E. H. Belknap of Detroit.

Charles Ackerson, formerly manager of the Precision Die Casting Co. plants, is now associated with the sales department of the Saxon Company.

E. H. Tinsman, former comptroller of the Oakland Motor Car Co., Pontiac, Mich., this week opened an agency for the Cadillac and Nash cars at Jackson. W. A. Sullivan, also formerly with the Oakland, in the advertising department, is associated with him.

J. R. Tennison, president of the Tennison & Blair Co., one of the largest automobile concerns doing a distributing and retail business in Dallas, Tex., died suddenly in California. He had gone to California on business and became ill on the train at San Diego, where he died.

He came to Dallas in 1866, when he was six years old. For years he was president of the Tennison Bros. Saddlery Co., one of the biggest saddle and harness houses in the Southwest.

J. H. Hansen, distributor of the Cadillac car for Omaha, Lincoln and Sioux City, left Sunday, July 23, for a seven weeks' trip abroad. He will visit his parents in Copenhagen and will travel in Norway, Sweden, Germany, Belgium, Holland and England before his return.

Alfred Reeke, president of the Reeke-Nash Co. and Reeke-LaFayette Co., Milwaukee, and for 20 years identified with the wholesale and retail distribution of the Rambler, Jeffery and Nash cars in succession, has been awarded a direct Nash distributing franchise with territory covering a large part of Ohio, and with headquarters in Cleveland, effective Sept. 1.

W. H. Hoyt, formerly manager of the Trenton, N. J., branch for the Packard Company, and prior to that Packard distributor at Charlotte, N. C., has joined the Packard Enterprises of Georgia, Inc., distributors in the Atlanta territory.

W. M. Libhart, for five years manager of sales of the Milwaukee branch of the Buick Motor Co., has resigned to become manager of retail sales and service of the Nash Sales Co., Wisconsin Division, Broadway and Oneida streets, Milwaukee, which takes over the retail Nash business in Milwaukee county in addition to continuing to handle the wholesale business in Wisconsin and Upper Michigan. Mr. Libhart has been associated with Buick about nine years.

F. E. Truax, of Chicago, has been appointed sales manager of the Milwaukee branch of the Buick Motor Co., to fill the vacancy caused by the resignation of M. W. Libhart, who has joined the Nash Sales Co., Milwaukee, as manager of retail service and sales. The Milwaukee branch handles the Wisconsin and Upper Michigan territory.

George Hunt, formerly sales manager of the Detroit Steel Products Co., has been appointed district manager for Rayfield carburetors in Detroit. Offices have been opened in the David Whitney building.

T. Harris Smith, recently general manager of the Packard factory branch at Kansas City, Mo., has joined the factory organization of the Mitchell Motors Co., Inc., as manager of advertising and sales promotion.

E. E. Russell, vice-president in charge of purchasing of the J. I. Case Threshing Machine Co., of Racine, Wis., has just returned from a three months' trip through Europe, where he has been studying European conditions.

Although the fair is some months away many applications have been received for spaces. The new building will be 150 feet square, and with a balcony 20 feet wide and 140 feet long there will be opportunity to display accessories. The building will be paid for by the newly formed Lewiston and Auburn Automobile Dealers' Association, of which V. S. Darling is temporary president. The automobile association will control it for 10 years, after which it reverts to the Maine State Fair Association free, with a clause that the latter shall lease it to the motor dealers for a reasonable sum.

R. & V. COMPANY RESUMES

EAST MOLINE, Ill., Aug. 4—Operations have been resumed at the plant of the R. & V. Motor Co. and the force is being increased as rapidly as materials and supplies are being received. A fortnight's suspension was ordered by Supt. A. A. Gustafson in July in order to take an inventory. This report was so satisfactory that a production campaign was authorized upon a larger basis for the final six months of the year than for the first half.

July Biggest Month in History of Tire World

Akron District Alone Turned Out a Basis of 33 Million a Year

AKRON, O., Aug. 5—July was the biggest month for production in the entire history of the rubber tire industry of America.

The Akron district alone during July turned out tires on a basis of 33,000,000 a year, July production here being in excess of 2,750,000 casings. On this basis of production and upon the basis of present tire requirements, these figures mean that at their present pace of production Akron district tire companies can meet practically the entire needs of the world.

With July's astounding production figure, tire output in the Akron area for the first seven months of the current year is estimated to have exceeded 11,000,000. Tire output was considerably less during the first three months of the year than during the following three months but from Jan. 1 steadily climbed, making conservative the 11,000,000 production estimate.

Daily production continues at about 107,000 tires a day here. This is a climb up from 85,000 a day six weeks ago, the increase in demand for tires which necessitated the heavier output coming at a time when practically all tire producing companies were "sitting tight" and were prepared for a seasonal slump in sales. But the falling off of sales failed to materialize when, according to all the laws of the industry based upon a study of every year's ebb and flow of production, there should have been a diminution of sales.

Whether this slump will come in August, manufacturers now are not prepared to say. They were outguessed by developments to such an extent in July that they were reluctant to venture a prediction for August and are content to accept conditions as they arise.

DURANT GETS MASON TRUCK

NEW YORK, Aug. 7—A truck line has joined the Durant family, it being announced today that the Mason Road King hereafter will be manufactured under the direction of W. C. Durant.

JULY OUTPUT PROBABLY 215,000

NEW YORK, Aug. 8—Complete returns are not in on July production, but it is safe to predict that the report of the National Automobile Chamber of Commerce will show that the seventh month of the year produced at least 215,000 passenger cars and trucks, a seasonal decline over June but in itself is a record-breaking event. A year ago, in July, the official production figures were 177,643.

DEALERS TO ERECT SHOW BUILDING

LEWISTON, Me., Aug. 5—In order to properly take care of the annual motor show in connection with the Maine State Fair the directors have just approved a contract for a \$15,000 building to be used exclusively for the display of motor cars, trucks and tractors each year.

IN THE RETAIL FIELD

Chippewa Valley Auto Co., Chippewa Falls, Wis., one of the earliest automotive concerns in northwestern Wisconsin, having been opened in 1908, is starting work on the construction of one of the largest and finest garages and service buildings in the state, to be located at Grane avenue and Bay street. It is to be ready Jan. 1. The investment in buildings and equipment will be about \$75,000. Frederick A. Bigler is president and general manager.

G. R. & S. Motor Co., Appleton, Wis., is erecting a new garage and repairshop, 30x75 ft., two stories and basement, on Washington, east of Morrison street.

Velie Madison Co., Madison, Wis., distributor and dealer in the Velie, has taken occupancy of its new garage and service building at 766-768 West Washington avenue, erected at a cost of \$25,000. O. C. Elsnor is manager.

Fellhofer Bros., Valmy, Door county, Wis., have opened their new garage and repairshop, 50x147 ft., erected to replace the building destroyed by fire about a year ago.

John H. Harter, Waukesha, Wis., has opened a new garage and repairshop in a new building erected by him on West Main street at a cost of \$20,000. He will specialize in service and storage.

Carl T. Stein, Madison, Wis., proprietor and manager of a general automotive service shop at 721 East Washington avenue, is a voluntary bankrupt. His assets are given as \$2200 and liabilities as \$9000.

United Consumers Corp., Milwaukee, owning and operating about thirty gasoline and oil stores and filling stations in Wisconsin, has acquired the entire interests of the Northern Wisconsin Oil Co., Menasha, Wis., conducting similar stores and stations in Neenah, Menasha and other Fox river valley cities.

J. J. Kroha, Milwaukee, has been promoted to the Detroit territory in charge of the automotive paint and varnish sales for the Milwaukee industrial sales department of the Patton-Pitcairn division of the Pittsburgh Plate Glass Co.

Wm. M. Maxwell Co., Milwaukee, has been appointed Wisconsin distributor of the Stutz. Offices have been opened at 306 First Wisconsin National Bank building, Milwaukee.

Layton Park Motor Co., Milwaukee, has been incorporated with a capital stock of \$30,000 to deal in new and used cars, trucks, etc., operate a garage and service station, etc. The incorporators are Louis P. Weber, Louis Schneider and Henry W. Kraft, all of Milwaukee.

Automotive Service Co. 779 Sixth street, Milwaukee, has plans for a new exclusive service station, 50x125 ft., at Twenty-ninth and Center streets, estimated to cost \$40,000 with equipment. Martin Froehlich is general manager.

Madison (Wis.) Garage & Machine Co. has been organized by C. L. Lodine and Samuel Olsen and opened a public service garage at 18-24 North Charter street. Mr. Lodine was for 15 years with the J. I. Case T. M. Co. Mr. Olsen has been with the Gisholt Machine Co., Madison, for many years.

The Alkire-Smith Co., Chevrolet agents at Salt Lake City, Utah, have erected a new garage in Ogden, at 2550 Washington avenue. This garage will be in charge of Mark Barnes, an old employee of the firm. G. C. Osburn is manager of the Ogden branch. The new building is of brick and is 33x70 ft.

Smith Motor Sales Co. 6140 Cottage Grove avenue, Chicago, has acquired a franchise for the sale of Maxwell and Chalmers cars and will handle these lines exclusively. F. H. and L. H. Smith are at the head of this company.

Townsend & Varner Nash Co. has been organized at Houston, Tex., for the distribution of the Nash automobiles in that territory. Both Townsend and Varner have been in the automobile business for a long time in Houston.

The Gaines Oakland Co. has established an agency and service station for Oakland cars at Augusta, Ga., acting as distributors in adjacent counties.

Associated Equipment Co. has been incorporated at \$250,000 to deal in farm implements and automobiles, by W. C. Warren and J. McCullough of Minneapolis, S. L. Copeland of Fargo, N. D., and F. O. Bacon of Minot, N. D.

Congress Garage Co., incorporated at \$50,000 to distribute Case cars in Minnesota, has opened a new garage at 315 Eighth street, Minneapolis. Sales and service will be established there. Oscar M. Nelson is president and Steve Hanson is service manager. L. O. Simonson, from the factory, will be representative.

Wabash Motor Sales Co. 318 Wabash street, St. Paul, has been named distributor for the Moon factory in southern Minnesota and western Wisconsin and the Twin Cities.

Northwestern Oldsmobile Co., distributor, has opened a new service station at 663 Selby avenue, St. Paul. Twenty-four hour service is given. Donald Horne is in charge. Accessories and tires will be carried.

Elmer Lukeman and Joseph Suter, Jackson-ville, Ill., who have been operating the Lukeman Motor Co. of that city, have purchased the Cain Ford garage at White Hall, Ill. They will handle Ford cars and Fordson tractors and conduct a service station.

Hartman-Delahunt Co. has been organized at Elmhurst, Ill., and has opened a plant at Virginia and York streets. The promoters are R. M. Decker, S. P. Herriman and P. J. Delahunt. The company will distribute motor cars, trucks and tractors, and also do a general service, repair and storage business.

Aurora, Ill., Auto Co. has opened a sales agency corner of New York and LaSalle streets, and will distribute the Velie car in the Kane county territory. Walter Matter is president and general manager.

Kirkmyer Motor Co., of Richmond, Va., showed their faith in the future of the automobile industry in Richmond this week when they signed a lease for the large Forbes Motor Company building, covering nearly half a block, on Automobile Row, for a period of 10 years. The building will be opened at once as the up-town branch of the business, and the Ford agency of the concern, the paint and repair shops and the battery service departments will be transferred to these new quarters.

The Oldsmobile Sales Co. is erecting a handsome new sales office and business establishment in the uptown section of Richmond, Va., at a cost of more than \$100,000. The building will be erected especially for the company and turned over to them in the fall.

Templar Motor Car Co. of Cleveland has made the Boston agency a regular factory branch, and it has been placed in charge of Frank H. Walley. For some time it has been operated as an agency but some of the officials at the factory were financially interested in it. From now on all New England activities will be directed from Boston by Mr. Walley.

Petersen Motors Co., Baltimore, Jordan and Locomobile distributors, has announced the appointment of the Jordan Sales Co. as branch dealers in Jordan cars. G. A. Forstburg, of Chester, Pa., recently formed the new company and has taken over a new garage, salesrooms and service station at 4221 Reisterstown road.

A new service station for owners of International trucks has been opened at 2565 Pennsylvania avenue, Baltimore, under the management of Charles H. Yetman.

Announcement has been made by Louis C. Block, Philadelphia, distributor for the Gray car, that a shipment of the machines has been sent to Baltimore and that he will open showrooms in Baltimore in the near future.

Earl-Nattans Co., Baltimore, it has just been announced, has been made the Baltimore distributor of the Earl line.

F. B. Stearns Co., manufacturer of Stearns-Knight motor cars, has announced the appointment of the Motor Car Co., Maryland and Mt. Royal avenues, Baltimore, as sole distributor for Stearns sleeve valve motor cars in Maryland. During last week a special Stearns-Knight show was held at the show rooms of the new distributor, at which the four and the latest Stearns creation, the new six-cylinder models, were displayed.

Franklin Motor Cars Co., Baltimore, will build an addition to the present service station at a cost of about \$30,000.

Walter M. Murphy Motor Co., which has been handling the Lincoln in San Francisco, Oakland, Los Angeles, Pasadena and Fresno since the Leland-built car first came on the market, has been named authorized sales representative in these cities for Ford cars, trucks and tractors.

Joseph Mulvihill Co. has been organized in San Francisco to distribute Marathon oils and greases throughout northern California. Joseph Mulvihill, member of the San Francisco County Board of Supervisors, is president of the company and Thomas Keough is secretary and treasurer.

Herbert Kayser, of San Francisco, has sold his interest in the firm of Kayser & Hannay, Ford dealers, and has joined the sales organization of Chester N. Weaver Company, Studebaker distributors in San Francisco, with which firm he was affiliated up to about one year ago.

Austin Abbott, of Atlanta, who has distributed the Stutz in the Atlanta territory for some time, has also taken over the distribution of the Rickenbacker.

Willys Corporation Claims Settled for \$750,000 Notes

Willys-Overland Co. Agrees to Compromise Adjustment of Dispute

TOLEDO, Aug. 5.—Litigation between the receivers for the Willys Corp. and the Willys-Overland Co. in relation to claims and counter claims was settled in the Federal Court here when all sides agreed to an order by which the Willys-Overland Co. paid to the receivers \$750,000 in three notes. The Willys-Overland Co. will also pay counsel fees.

The intercompany accounts which are limited to a balance of \$167,197.43 owing to the Willys Corp. by the Overland and to a balance of \$189,554.15 owing to the Willys-Overland on its own account and for the Willys Morrow Co. also, by the Willys Corp., will be ironed out by special master Curtis T. Johnson.

The settlement is in the form of three notes, each for \$250,000 to bear interest at 4 1/4 per cent and due serially May 31, June 30 and July 31, 1923.

"The court believes that it has been profitable to both sides of the dispute to avoid litigation," declared Judge Kil-lits from the bench. "The court has had a desire to go into the merits of the case but great delay probably would have resulted with no better results."

The claims of the Willys-Corp. against the Overland company grew out of the sale of common stock to the corporation in 1919, and a contract dealing with the development of the Chrysler six car.

The attorneys finally agreed that it would have been exceedingly difficult to prove fraud in connection with the stock transaction. The sale was approved by stockholders and incidentally President John N. Willys personally purchased a large block at the same time, evidencing good faith in the transaction.

The Willys-Overland claims totaling nearly \$5,000,000 were based upon the expenditure made on the Chrysler six which it designed and developed. The Willys Corp. was to manufacture the car in its plant at Elizabeth, N. J., built at a cost of more than \$13,000,000.

Depression hit the industry about the time for beginning production and the car never was produced or marketed.

The settlement made is based upon this contract between the two companies. The settlement practically divorces the two companies completely with the exception that the Willys Corp. receivers still own a block of common stock in the Willys-Overland Co. representing almost a one-third interest.

DEALER CANDIDATE FOR U. S.

DES MOINES, Ia., Aug. 4.—Clyde L. Herring, head of the automobile company which bears his name and one of the best known men in the automotive business of the country, opened his campaign for United States senator from Iowa on Democratic ticket at Sibley, Ia., recently.

The READERS' CLEARING HOUSE

Questions & Answers on Dealers' Problems

Illinois Law of Headlights and Lenses

Q—Give law in the state of Illinois on headlights and headlight lenses. Must a person use a patent lens or not? What is the law in regards to bright lights on the state roads?—Coats Garage, Aurora, Ill.

The law in Illinois does not require the use of a patent lens in headlights on automobiles, but where patent lenses prevent a glaring or dazzling light the law does not require a driver to dim, or extinguish his headlights on approaching and passing another. Your questions are answered comprehensively by the statute which is here set forth:

"269p. Lamps—Duty to carry—Duty to dim except where city ordinance provides parking places. When upon any public highway in this State, during the period from one hour after sunset to sunrise, every motor bicycle shall carry one lighted lamp and every motor vehicle two lighted lamps, showing white lights, or lights of a yellow or amber tint, visible at least two hundred (200) feet in the direction toward which each motor bicycle or motor vehicle is proceeding, and shall, also, exhibit at least one lighted lamp which shall be so situated as to throw a red light visible in the reverse direction. The number plate at the back of the motor vehicle, so that it will not swing loosely, and shall be so lighted that the numbers on said plate shall be plainly legible and intelligible at a distance of fifty (50) feet.

Dim Lights at 250 Feet

On approaching another vehicle proceeding in an opposite direction, and when within not less than two hundred and fifty feet of same, any person in charge of a motor bicycle or motor vehicle with electric headlight or headlights, shall dim or extinguish such headlights. The provision herein contained in regard to dimming or extinguishing of headlights shall not apply when such headlights are equipped with an anti-glare device or lenses which prevent a glaring or dazzling light. During the period from one hour after sunset to sunrise every motor bicycle or motor vehicle which is standing on any road, highway or street shall display a light on the front and the rear of the same.

However, any city, town or village, by ordinance, under rules and regulations, may prescribe, designate any part or parts of any street, or other highway therein, as parking places in which motor bicycles and motor vehicles may be parked without having their lamps

The Readers' Clearing House

THIS department is conducted to assist dealers and maintenance station executives in the solution of their problems.

In addressing this department, readers are requested to give the firm name and address. Also state whether a permanent file of MOTOR AGE is kept, for many times inquiries of an identical nature have been made and these are answered by reference to previous issues.

Inquiries not of general interest will be answered by personal letter only. Emergency questions will be replied to by letter or telegram.

Address of business firms will not be published in this department, but will be supplied by letter.

Technical questions answered by B. M. Ikert, P. L. Dumas and A. H. Packer; Legal, by Wellington Gustin; Paint, by G. King Franklin; Architectural by Tom Wilder; Tires, by a Practical Tire Man; General Business questions, by MOTOR AGE organization in conference.

lighted, as otherwise required by this section. Such parking place or places shall be lighted."

Hurds Revised Statutes, 1921, Chapter 121, Vol. 2, page 2815. This act was put in force January 1, 1922.

INSTALLING BALL OR ROLLER BEARINGS

Q—Advise how ball or roller bearings could be installed for both the main bearings and connecting rod bearings on a Ford engine for racing purposes.

1—The installation of ball or roller bearings is very difficult as it is necessary to use a split type of bearing. On the main bearings the installation is nearly out of the question as the rollers require more space than the babbitt and in cutting away to get room enough, most of the cast iron would be cut away, leaving the remainder too weak to support the load. In the case of connecting rods, special rods can be used with the lower portion made large enough to take roller bearings. Ball bearings are nearly out of the question as they require retainers which cannot be put on.

The installation of roller bearings is one which may be attended with considerable trouble unless a great deal of experimental work is done. Motorcycle engineers are most familiar with this type of construction and a man by the name of Bradshaw has written numerous articles on this type of design which have appeared in an English motorcycle

paper which can probably be obtained at any large public library.

The connecting rod and cap would have to be carefully doweled together and then bolted with the connecting rod cap bolts after which the outer race for the rollers would have to be carefully ground so that the rollers would pass over the joint without any appreciable effort. If on reassembling, the cap and rod do not line up perfectly, the rollers will be rapidly destroyed so that it is easy to see that very accurate machine work must be employed. A source of supply for rollers $\frac{3}{8}$ in. in diameter and $\frac{1}{8}$ in. long will be given by letter. These would apparently require two separate raceways to be machined in the connecting rod.

Changing Stroke of Ford

2—Would it be advisable to change the stroke of a Ford engine to 6 in. by lengthening the throw by means of welding. Assuming that the welds were perfectly made, would the strain be excessive on the crankshaft?

2—We doubt very much whether such a construction would give satisfaction even aside from the strength of the weld. It would also require a special crankcase.

Racing Cylinder Block

3—Is there any other cylinder block besides the Ford cylinder block which can be used with the racing head originally designed for Ford cars?—Duke O'Hara, Niles, Michigan.

3—We understand that it is possible to use an Overland engine with the Ford racing head provided the cylinder head bolt holes are plugged up and new ones drilled in the proper location.

SPEED OF COLUMBIA SIX

Q—What speed should be attained from a Columbia Six with a 7-R Continental engine using 32x4 Cord tires and geared 4 $\frac{3}{4}$ to 1?

1—The speed that can be attained with such a layout depends entirely on the maximum engine speed. Assuming a maximum engine speed of 2600 which would be approximate for this engine it should deliver a theoretical speed of 52 m.p.h. Deducting approximately 7 to 10 per cent for slippage the car will show between 45 and 50 m.p.h. actual road speed, at 2600 revolutions.

2—What gear ratio should be used to have this car make from 60 to 65 m.p.h.?—G. M. C. Metallic Grease, R. G. Vandenboom, Quincy, Ill.

2—As stated in the above question, the gear ratio will depend on the maximum engine speed. If we adhere to the maximum of 2600 a gear ratio of three and three-quarters to one will give a road speed of between 60 and 65 m.p.h.

Storage Garage With Small Shop.

PLAN NO. 418.

I am enclosing a sketch of a garage I contemplate building on a central location in this city. The lot is 60x161 ft. on a side street of great width. It is an inside lot 110 ft. from the corner and with no business houses connecting. The second floor will be storage exclusively and am at loss to use hydraulic elevator or ramp or both in case of electric trouble. On the first floor I am going to have a salesroom and office with chauffeur's restroom. The elevator is to be used for repair department, including battery work.

Want stockroom, small accessories only through office. Also want a small waiting room for women, having in mind that which city ordinance calls for—toilets on outside walls. Please give me your best advice about the heights of the two floors and the safety device dividing car spaces. If the flat-iron type is preferred, state how far it should extend from wall. I should judge 12 ft. as an average.

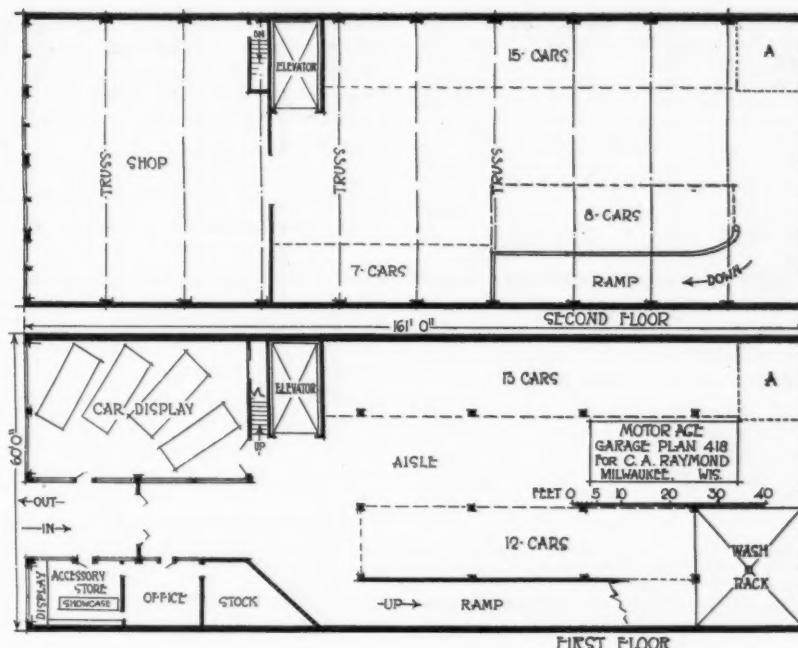
I presume that a structure of this kind can be erected at a cost of \$2.50 to \$2.60 per square foot at this time. You would probably recommend steam heat and the small basement for this plant would be located in part of building.—C. A. Raymond, Milwaukee.

The first suggestion we would make is that you give as much space as possible on the first floor to storage as it is most suitable for that purpose. Perhaps you do not realize it but you will have no light on the lower floor except a narrow strip at the back end which is good as far as it goes but with another building across the alley it would be quite inadequate for a first class shop. These two perfectly good reasons argue strongly for a second floor shop with the bulk of the storage on the first floor.

The size and location of your property does not lend itself especially to the ramp idea but it can be managed. There is only one practical way to build it, namely, along one side wall but the width permits only a narrow ramp and even then cuts down the garage width to a minimum—less than 50 ft. You are evidently catering to high grade storage at substantial rentals and, if so, the ramp might well be discarded.

You are up against a problem on your rest and toilet rooms that we would prefer to leave to your architect. Unless you make a court or light shaft somewhere in your side walls there is practically no place for them except the spaces marked "A" and neither of these are very well suited to women's use.

We will not consider the basement as entrance to it is doubtless also controlled by city ordinance. Steam heat is considered best. First floor ceilings are usually made 12 ft. in the clear under beams but may be more or less usually more if the showroom is large. On the



It is suggested that as much space as possible on the main floor be devoted to storage, leaving the second floor for the shop

second floor 10 or 11 ft. clearance under the trusses is ample.

As to flatiron floor guides, we have found by careful diagraming that they are of little use unless about an extra foot of space is allowed between cars. When they are used drivers are apt to depend too much on them and thus they must be fool-proof or not used at all. In this way they cut down the storage space considerably. We cannot throw much light on the cost problem but believe it would be more apt to be over \$3.00 per square ft. than under.

OIL PRESSURE OF 7-W CONTINENTAL MOTOR

A subscriber recently asked for information in regard to trouble with the oil pressure on a 7-W Continental motor. The following information has been obtained from the Continental Motors Corp. in regard to this condition:

In most every instance, where we have received reports of oil gages not properly indicating, it has been found that either the tube on the inside of the gage has been bursted, or taken a permanent set, or it is because of the oil having been allowed to become too thin.

In addition to the above, we have found that in all plunger pumps, such as used in the 7-W motor, the needle will vibrate with the action of the pump plunger. We have overcome this by the installation of a small restriction plug between the pump and the tube which leads to the gage. This is simply a connection having in it a number 70

drilled hole. The size of this hole is such that it will permit of the oil being forced into the gage tube sufficiently to indicate proper pressure, but will not permit of this column of oil flowing back with each stroke of the pump plunger.

Another, and perhaps more simple correction would be loose plugging of the lower end of the gage tube with a piece of round felt, or candle wicking. This method has the disadvantage in the cold months, however, of requiring longer time to warm up and permit the gage to operate.

It should also be noted that it is essential to change the oil in the motor every 500 or 600 miles to prevent its being excessively diluted.—Continental Motors Corporation.

TWO GASKETS UNDER HEAD?

Q.—Would putting two gaskets under the cylinder head decrease the power and pulling qualities of an engine. This is necessary to keep the valves from hitting the cylinder head.—Edward Doebbeling, Craig, Mo.

An extra gasket will have a slight effect in decreasing the compression and will accordingly cut down the power slightly. You do not say what kind of a car or engine you refer to nor what special changes you have made which cause this trouble. Ordinarily parts of an engine are properly made so that trouble of this kind does not occur. If an extra gasket will overcome the trouble, however, would suggest your using same as the effect on the power will be slight.

Architectural Service

In giving architectural advice, MOTOR AGE aims to assist its readers in their problems of planning, building and equipping, maintenance stations, garages, dealers' establishments, shops, filling stations, and, in fact, any building necessary to automotive activity.

When making request for assistance, please see that we have all the data necessary to an intelligent handling of the job. Among other things, we need such information as follows:

Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.

What departments are to be operated and how

large it is expected they will be.

Number of cars on the sales floor.

Number of cars it is expected to garage.

Number of men employed in repair shop.

And how much of an accessory department is anticipated.

FORD LIGHTS BURN OUT

Q—We are having trouble with the lights burning out on a Ford. It will burn out either 12-16 or 18-24 volt lights. The wiring is all new and everything seems to be in good condition. What is the cause of this trouble?—Zorn Auto Co., Osceola, Wis.

You do not state whether the Ford in question is one of the type equipped with starter or one of the older types. On the Ford car that does not have a starter 9-volt bulbs should be used in each headlight, these being connected in series, that is, in such a way that the same current that goes through one also goes through the other before getting to the frame of the car. If these burn out it is doubtless due to incorrect wiring or to the omission of an inductance coil. One of these coils can be obtained from an authorized Ford station.

It is wired up in such a way that the headlight current must go through it and at high speed has a greater effect than at low speeds on account of the increased frequency of the Ford magneto current. If the trouble you are experiencing is on a Ford equipped with starting and lighting and having a six volt battery it is due to a poor connection in the circuit from generator to battery which prevents the generator current going to the battery and causes it to go to the headlights where it burns them out. Six volt lamps are correct on Fords that have starting system and it should not be necessary to use the high voltage bulbs you mention.

A poor connection which would cause this trouble might be at the battery ground or at either of the battery terminals or might be due to a poorly burned connection inside the battery itself, although none of these possibilities could exist if the starting motor is working as poor connections will stop the action of the starter before they cause any other trouble. From the battery side of the starting switch a small wire goes up to a junction block at the left side of the dash and from the junction block another lead goes to the ammeter. From the ammeter a wire goes to the cut-out and if the cut-out is mounted on the dash the connection is then from another cut-out terminal down to the generator. The best way to locate trouble of this kind is with a voltmeter with the engine running at moderate speeds, so that the generator is just barely charging the battery.

The voltage should then be taken from the live battery terminal to the frame of the car also from the live generator terminal to the frame of the car. If the battery voltage is seven and the generator voltage 11 or 12 it would show that there was a poor connection at some point. It would then be necessary to test back along the circuits from generator to battery until the point was found, where on one side the voltage was low and the other side high. On the other hand if the battery voltage should be 7 and the generator voltage 7.5 it would show merely normal resistance in the circuits. If you do not have a test voltmeter it may be possible to find the

trouble by mere inspection or pulling at the wires and connections to see if any of them are loose, paying special attention to the circuits from the starting switch up through the ammeter to the generator.

SUBSTITUTE REGULATOR FOR JESCO GENERATOR ON KEETON

Q—Show method of wiring up Jesco motor generator as used on Keeton car when the standard controller designed for the apparatus is not available.—W. C. Scott, San Antonio, Texas.

1—Below is shown a diagram in which the circuits of the Jesco motor generator are indicated. This diagram also including a 3 pole double throw switch, two 8-volt batteries, an ammeter, a six-volt cutout and a two gang lighting switch with coils of iron wire mounted on the back of it. The two gang lighting switch is used as a sort of regulator in place of the magnetically operated one originally used. Some experimenting will be necessary to get the right resistance for the iron wire coil. When both of the switch buttons on the two gang switch are pushed in the charging current will be maximum and when both are out the current will be reduced as much as possible. If the current with both buttons pulled out should be over 12 amperes it would probably be best to increase the length of the iron wire coil or use a smaller size. The 6-volt cutout will be operating on 8 volts which will require a slightly stiffer spring adjustment. A good 6-volt cutout, however, can probably be used by slightly bending one of the fingers so as to stiffen the spring. The three pole switch in the down position will connect the two batteries in series giving 16 volts to the motor generator for starting while in the up position it will throw the batteries in parallel and also connect the fine winding of the cutout so that the generator can cut in and charge the battery. The extra connection used for the fine winding of the cutout is necessary as if this is not employed the fine winding will be connected

to the voltage of both batteries when operating the starter switch which will cause its points to close connecting it to one of the 8-volt batteries and both of them at the same time, in other words putting a short circuit on one of the batteries which would burn up some of the wiring. If a Maxwell starting switch is available such as used about the year 1916 where the operation of the pedal changed the connection from series to parallel, this could be used instead of a three pole switch, but care must be taken to also use the connection which disconnected the fine winding of the cutout.

If the engine should be operated without throwing the three pole switch over to the running position, there would be a good chance of burning the generator, as operation without a load overheats the fields of automobile type generators, and the heat transmitted to the armature also ruins it.

FORMULA FOR COMPRESSION RATIO

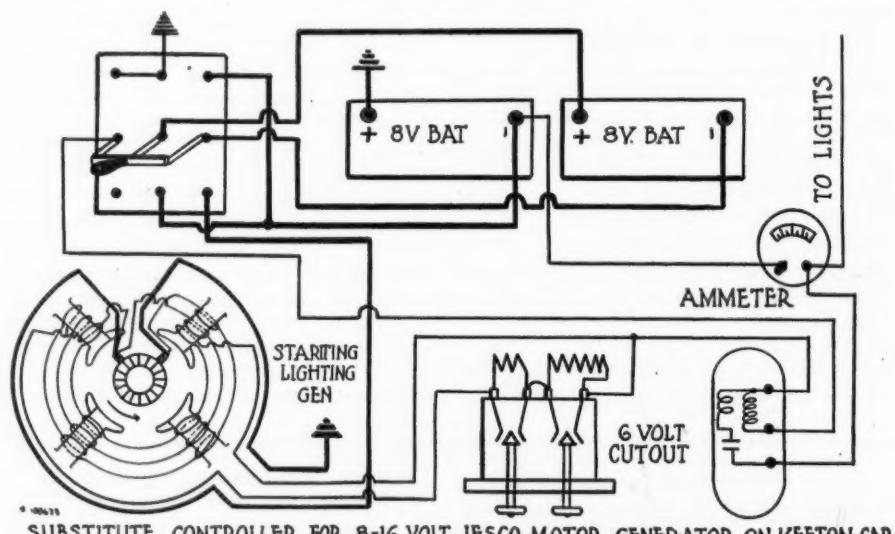
Q—Give formula for getting compression ratio and what is meant by same.—T. W. Crooks, care of Auto Repair & Welding Co., 312 S. Blount St., Raleigh, N. C.

Compression ratio is the air space in the cylinder when the piston is down divided by the air space in the cylinder when the piston is up. The greater the compression ratio the greater will be the compression in pounds per square inch, as registered by a gage.

UNIVERSAL JOINTS ON OAKLAND AND CHALMERS

1—Inform us what make of universal joints was used on Oakland 34-B or Chalmers cars and where we can get service parts for same?—Auto Parts Co., Nashville.

1—The joints used in both the Oakland and Chalmers cars are manufactured by the Mechanics Machine Co., of Rockford, Illinois. This firm will supply repair parts for these joints.



This type of controller, using a two gang switch with resistance coils, can be used to replace any vibrating regulator of obsolete design

Generator Charges Only 10 Amperes

1—We have a model O, 1919, Hudson on which the motor generator is giving some trouble. When the engine starts up it begins to generate and charges up to 10 amperes at 15 to 20 miles per hour. As soon as we speed up past this point, however, the ammeter hand will drop back to zero, but when the engine is slowed down and again speeds up the ammeter will show charge again, and then as soon as the speed increases above 20 miles per hour the ammeter drops back to zero again. The generator has been overhauled and a new switch spring has been put in at the motor end and all connections have been checked and found to be tight, but this work did not improve the operation. The generator seems to get pretty hot after the car has run for a while. Advise how to test to locate this trouble, as we have a Weston garage type volt ammeter.—Edward G. Fritz, Oklahoma City, Okla.

1—We would first suggest your testing the armature by disconnecting the field circuits so that when the generator is running it will be generating a slight voltage only, due to its residual magnetism. You will note from a wiring diagram of this system that a heavy lead from the battery brings current to the motor generator. From the large terminal where this heavy cable is attached a smaller wire goes to the ammeter and from the ammeter current is carried to the switch. Operation of the ignition switch does three things. First, it carries current to the ignition coil. Second, the same connection which supplies the ignition circuit supplies the current to the field circuit of the generator.

Third, the operation of the ignition switch carries battery current to the generator switch. While we stated that the field circuit should be disconnected for the test to be described, it would be just as satisfactory to lift the third brush from the commutator while making the test. You can now use the voltmeter side of your combination volt ammeter with the two leads connected to the two main brushes and run the engine at a speed equivalent to about 10 miles per hour. If there is no indication on the voltmeter, then use a more delicate scale, going down to the milivolt scale if necessary.

As the engine speed is changed, the reading on the voltmeter or milivoltmeter should change in exact proportion. Now speed up the engine gradually and watch the voltmeter. If its indication increases gradually and continues to increase up to the highest possible engine speed, then the armature and brush contact are apparently all right. Should it rise to a certain point on the scale, however, and then show fluctuation or drop back to zero, it would show that the trouble you are experiencing is either in the armature or in the brush contact.

If the trouble is in the armature, it is due to a short or ground which takes place due to the centrifugal force at the high speed. On the other hand, it is possible that at some time the commutator has been turned and is not exactly concentric with the bearings so that at

high speed the brushes fly off of the commutator and the voltage fluctuates accordingly. If such a condition occurs it might be well to add to the brush spring pressure by bearing on the brushes with the fingers, and if this steadies the voltmeter reading, the trouble is doubtless due to the commutator eccentricity. If pressure of the fingers does not improve conditions then a new armature should be tried.

If on the above test the armature and commutator seem to be alright, we would suggest your connecting the ammeter in series with the field circuit and with the engine standing still, that is, not running, move the ignition button slightly and pull on the wires on the back of the ignition and lighting switch to see if there is a poor connection anywhere which would affect the field circuits, as it is possible that at a speed of 20 miles per hour there is a certain vibration of the car which breaks the circuit. The same check can be made by connecting the ammeter in the armature circuit.

Another suggestion is that you increase the third brush spring pressure temporarily by pressing on it with the fingers where the trouble is experienced as you previously described to see if increased tension here would overcome the trouble. While you have checked all connections, suggest that you test them again by exerting a slight pull on each one to see if they are securely soldered, as it sometimes happens that a connection appears to be all right when it really is not. This applies to the terminals on the field connections, the brush connections and every connection you can find in the generator or outside of it which has in any way to do with the charging circuit.

Overhauled Overland Engine Will Not Pull

Q—We have an Overland car which does not work right, although it has been thoroughly overhauled. Compression is good, a new carburetor has been installed, valves have been properly seated and have the right clearance, and a new ignition coil has been put on. We have also installed a new distributor and interrupter, but in spite of these additions, we are having trouble after the car has run a while and after a heavy pull, as it misses and spits back in the carburetor, although O. K. when idling. It also fires in the muffler occasionally. What is wrong?—Edward J. Mill, Mill Bros. Garage Co., Alston, Mich.

1—We would first suggest that you test the spark by having all of the high tension wires on the spark plugs loose, so that they can be removed one at a time. Then start up the engine and take one spark plug wire from its spark plug and hold it within 3/16 of an inch of the engine so as to form a test gap. With the engine running slowly the spark should jump every time at this test gap. Do the same at all of the spark plugs, counting the sparks up to 50 or 60.

If the spark jumps six or seven times and then misses one and then perhaps ten times and misses again, it shows the

ignition system is defective, either due to a weak ignition coil, to burnt interrupter points, or to a loose condenser or to a poor connection in the wiring. If the spark is O. K., however, it would be well to run the engine until it is quite hot and the trouble that you experience is noted again and then tested to see if the spark has become weak.

If it has, it indicates that a new coil should be used, even if you have recently installed one. Would also suggest your checking the timing, as in the retard position the interrupter points should open just as the exhaust valve on any cylinder closes.

A good way to check this is by putting a piece of thin paper between the stem of the exhaust valve and the tappet which lifts the valve. When the valve is up the paper will be pinched so that it cannot be pulled out without tearing it, but when the valve seats the paper can be easily pulled out and just as the paper is released the interrupter points in the distributor should open, but they should not be widely opened, just beginning to open. If the spark and the timing are O. K., would suggest that you check the clearance between the valve stems and tappets, as this should not be less than .004 inches.

If when the engine gets hot you again experience this trouble, would suggest that you try the valves to see if they are sticking. It is also possible there is a slight obstruction in the gasoline line which allows enough gasoline to go by when idling, but when the engine runs at high speed does not allow the fuel to feed fast enough to supply the demand and it might be well to blow out the gasoline line and be sure that no obstruction is present. A speck of dirt in the carburetor may also cause the same condition, although it usually gets under the needle valve and tends to flood the carburetor, which is just the opposite condition from what you have described.

DRILLING HOLE IN WINDSHIELD

Q—Advise the easiest way of drilling a one-quarter-inch hole through a windshield glass.—Gay Rice, Memphis, Mo.

For drilling holes in glass, a common steel drill, well made, and well tempered, the Glassware Review claims to be the best tool. The steel should be forged at a low temperature, so as to be sure not to burn it, and then tempered as hard as possible in a bath of salt water that has been well boiled. Such a drill will go through glass very rapidly if kept well moistened with turpentine in which some camphor has been dissolved.

Diluted sulphuric acid is equally good if not better. It is stated that a Berlin and Glass Casting Co. drills and machines glass castings like iron ones and in the same lathes and machines by the aid of sulphuric acid. A little practice with these different plans will enable the operator to cut and work glass as easily as brass or iron. The main thing to watch in this procedure is to get the proper cutting fluid and to secure a drill that is unusually hard.

GRAPHITE ON FORD BANDS REPORTED A FAILURE

Q—We noticed in the June 15 issue of *Motor Age* on page 44 an article entitled Graphite on Ford Transmission. We tried out this method of treatment which the Fox Garage of Cedar Rapids, Iowa, claimed to be effectual in the stopping of the chattering of the transmission bands. Instead of eliminating the tendency to chatter it produced a glazed surface so that the bands would either slip or grab. The operation of the bands had formerly been fairly satisfactory but was worse after applying the treatment.—W. G. Landon, Heath, Mass.

1—The use of graphite on the Ford transmission bands was submitted in this issue of *MOTOR AGE* in accordance with a letter received from our subscribers, but as stated *MOTOR AGE* has not had opportunity to try out this treatment.

The use of castor oil, however, has been found to produce very good operation on the transmission bands but it has one difficulty that the castor oil settles and forms a solid substance in the bottom of the flywheel housing and also in the trough in the lower engine pan into which the connecting rods dip. This means that it is hardly safe to put the castor oil in the engine on a car handled by an inexperienced operator, although when the car is taken care of by a good mechanic it can be used to advantage.

For every quart of oil which is poured in through the breather cap one quarter of a pint of castor oil should be poured over the transmission bands. Then, when two gallons of castor oil have been used in this manner the engine should be cleaned out. The engine pans can be removed and the solid castor oil scraped out. The oil can be drained from the engine by removing the drain plug in the bottom of the flywheel housing and the plug can then be replaced and a small quantity of alcohol can be poured in over the transmission bands and allowed to stay in the flywheel housing for some time.

It will also help to agitate the alcohol by turning the engine over by hand or with the starter but the engine should not be run with alcohol in. As the alcohol is very combustible, care must be taken to see that it is all removed which can be done when the castor oil is dissolved by again draining the flywheel housing and pouring a little fresh oil into the transmission to wash out any alcohol which may be left.

The use of castor oil also tends under conditions of extreme neglect to clog up the oil pipe so that occasionally this should be cleaned out by removing the transmission cover and running a flexible wire through the oil pipe to prevent the formation of the solid castor oil in the oil pipe, and it would be well never to leave the car standing for any great length of time with the front of the car uphill with respect to the rear of the car, as some of the castor oil might settle in the bend of the oil pipe and form there.

CHANGE REAR DRIVE ON H2½ CHEVROLET

Q—We would like to change the rear drive on a model H2½ Chevrolet. We are

figuring on removing the torque arm and brazing spring saddles to the axle. Would this system work all right on a three-quarters elliptic spring? Would we have to reinforce the lower spring? Any suggestions as to method of improving this drive would be appreciated. — Ulmer Garage, Cleveland, Ohio.

On this model Chevrolet the propeller shaft is exposed and two universal joints are used. A separate torque arm is provided to keep the axle from rocking backward as the car is driven forward. We are somewhat curious to know what the objection is to this type of drive and we doubt whether the change you contemplate would really be an improvement. With the drive through the spring all of the torque would be taken by the brazed joint on the axle. The front end of the rear spring would have to be connected without a shackle of any kind to a bracket strong enough to take the driving force and in addition to this you would have to provide some sort of slip joint in the universal as these may not have enough "fore and aft" movement to allow of this type of drive.

When driving through the spring each time the car hits a bump there is a tendency for the rear spring to flatten out and push the axle backward. This also has a tendency to tighten the brake rods, even if they are pivoted at about the same position as the front end of the rear spring. Summing up the situation, we believe it would be best to leave well enough alone as you will no doubt get into trouble of one sort or another.

CAN MOTORS FROM AN ELECTRIC AUTOMOBILE BE USED FOR BATTERY CHARGING?

Q—Advise if there is some way of getting D. C. from a Ford magneto or if it is possible to secure some sort of rectifier that would make D. C. from the current obtained from the magneto. If so, advise names of concerns making same.

1—Direct current cannot be obtained from the Ford magneto, nor do we know of any concern making a device which has proved successful commercially, although we have heard of such devices being tried out. In general, we would say that the output of the Ford magneto is not sufficient to make such a proposition satisfactory.

Changing Motors to Generators

2—We have a couple of direct-current five-horsepower motors which were formerly used on electric automobiles, one being used on each rear wheel. Can these be changed over from motors to generators without changes in wiring or brushes?

2—Electrical motors used for running automobiles are series wound, which means that the same current goes through the armature which goes through the field. Machines for generating current must universally be shunt wound, which means that there are two parallel or separate paths through the machine, one through the field magnet winding and the other through the armature. These machines will, therefore, not be satisfactory and cannot be used for generating unless they are rewound and connected differently.

H.P. OF FORD STARTING MOTOR

3—What is the horsepower of the starting motor used on a Ford car and is it possible to use this motor for continuous work?

3—The exact horsepower of the Ford starting motor is difficult to state, as it varies between wide limits, depending on the load put upon it; in other words, being a series motor, it is capable of doing more or less work. You can determine the horsepower input, however, by multiplying the voltage by the current or amperes and dividing this value by 746. When cranking the engine the starter is operating at a pressure of about 5 volts and drawing about 125 amperes, which, multiplied together, gives 625 watts. Dividing this by 746 gives about .84 horsepower being used from the battery. This, of course, is not the exact horsepower being developed by the starting motor or supplied to the engine, as this will be less, depending on the efficiency of the starting motor. Assuming that the efficiency is 70 per cent, we would then have about .59, or roughly one-half horsepower developed by the motor. The starting motor can be used for operating for short periods of time, the only limit being the heating of the machine, and this can be determined by feeling it occasionally or by using a thermometer located under the commutator cover. The heating should not be allowed to run about the boiling point of water, which is 212 degrees Fahrenheit or 100 degrees Centigrade. Starting motors of this type have been used for semi-continuous operation in driving generators for test bench work where a run of a few minutes only was considered necessary. A starting motor could also be used for running an emery wheel or other such device which is not used for very long periods at a time.

Tungar Bulbs and Outfit

4—We have several new Tungar bulbs but have no Tungar outfit with which to use them. Could a transformer be used or could you advise of some method of using these other than with the regulation rectifier?—Mubleria J. Prat, Monterey Nuveo Leon, Mexico.

4—We would not recommend experimenting with a transformer or other device than the regulation rectifier. The reason for this is that one current must be obtained for the filament of the bulb which has to be exactly right. In the regulation rectifier this is obtained by tapping in the correct number of turns to give the right voltage. Aside from this voltage a variable voltage is also required for use in charging the battery and it is on account of these complications that we feel that satisfaction would not be obtained with a homemade device.

BORE AND STROKE OF ABBOTT-DETROIT

Q—What is the bore and stroke of the Abbott-Detroit touring car 1912 model B, No. 682, engine No. 643.—Frank Rex, Pawtucket, R. I.

The bore of the model B Abbott-Detroit is 4 inches and the stroke is 4½ securing an S. A. E. h.p. of approximately 26 or 25.6 to be exact.

DODGE CLUTCH DRAGS

Q—We have a 1922 Dodge roadster that has run only 500 miles on which we have great difficulty in shifting gears. The motor has to be run very slowly going from first to second speed in order to shift without very much of a clash. When shifting from second speed to high speed there is always a clashing no matter what the speed of the car is. It seems as if the gears do not stop spinning. What is the cause of this trouble?

1—The first possibility is that the clutch throw-out bearing has been greased too thoroughly and the excess lubricant has worked in to the clutch discs. This is a dry disc clutch which requires no lubricant and if grease gets on the discs it causes them to stick together so that the clutch does not release. This causes the gears to continue to be driven and produces the clashing complained of.

The remedy is to take a cork or small plug of wood and temporarily close up the drain holes at the bottom of the clutch housing. The top cover of the clutch can then be removed by taking out two bolts and a quantity of kerosene can be poured in. The engine should then be run and the clutch pedal worked back and forth to allow the kerosene to wash it freely. After this has been done for a while the plug should be removed and the engine run and the clutch pedal worked again back and forth to allow the kerosene to be thrown from the clutch and to drain from the clutch housing.

When this method of treatment is used it is best not to use the car immediately and to block the clutch pedal down in some way so as to hold the discs apart and let them dry out. If this is not done the kerosene will cause the clutch to slip considerably. If this treatment does not remedy the condition, it is due to the clutch containing a warped disc and under these circumstances it should be taken to the nearest Dodge service station to have a good disc installed.

2—We would like to know if there is any reliable compound on the market for lapping in connecting rod and crankshaft bearings. We have seen some compound advertised in Motor Age but do not know whether it is safe to use or not.—Thos. J. Butler, Pleasant Plains, Ill.

2—The readers of Motor Age that are not familiar with our policy will be interested to know that only such products are advertised in Motor Age as are known to be reliable. While there is often a difference of opinion as to the exact merits of certain products, it is nevertheless, recognized that products advertised in Motor Age are fundamentally right. Questionable articles or products known to be injurious by the Motor Age staff are rejected from the advertising columns and if it is found that any advertisement that has been inserted promotes the sale of an injurious article or one which has no value, that advertisement is promptly rejected from future issues. We would, therefore, recommend that you use any of the compounds which you have seen advertised, making sure, of course, that you use them in the method recommended by the

maker. These materials which are developed for use in fitting bearings are entirely different from valve grinding compounds which usually contain emery dust and should not be confused, as it is fatal to use valve grinding compound in fitting bearings, as the small particles of emery embed in the babbitt and cause destructive action on the shaft. The bearing fitting compounds on the contrary while they have a temporary abrasive action wear away in a short time so that even if small particles should be left in by accident they will cause no injurious action.

MAXWELL ELECTRICAL HASH

1—Is it possible to use the panel from a 1917 Maxwell in connection with the electrical system of a 1918 Maxwell?

1—No. The 1917 Maxwell starts using 12-volts and generates on 6 volts. The combination cutout and regulator on the panel board is therefore designed for 6-volts. On the 1918 Maxwell the cutout and regulator is designed for 12-volts and these two are not interchangeable.

2—In a previous issue of Motor Age we see that you say a 12-16 volt system can be used with a 6-volt battery if starter is not used, but that a 6-8 volt generator must be used. Will not the 12-16 volt generator work on a 6-volt battery in this car?

2—You have not stated the exact issue in which you saw this Clearing House article and we are under the impression that you have mixed up two statements from two separate and distinct problems. The first part of your question however, refers to a system such as the 1917 Maxwell where any one machine draws current from a 12-volt battery and operates as a starter, the 12-volt battery being required to give it enough torque to crank the engine.

When generating however it generates at 6-volts. It is on this kind of a system that a 6-volt battery could be used as the machine would operate normally as a 6-volt generator. It would not have enough torque however to crank the engine if an attempt was made to use the battery to supply starter current. On this installation an extra generator is not required.

In another problem the starting mechanism on a car was operating properly but the generating mechanism including a voltage or current regulator of some type was not in good condition. It was under these circumstances that the addition of the extra generator was recommended.

3—Will not a 6-volt cutout work on a 12 volt system and will it be a failure to put a 12-volt cutout on a 6-volt system?—Harry S. Lamborn, Prop., Gould Battery & Service Station, Burlington, Kansas.

3—If there were no need for the two different types of cutout there would be no service station that would stock both types. The 6-volt cutout if used on 12-volts will overheat and burn itself up and the 12-volt cutout if used on the 6-volts will not draw enough current to close at the right time. In general it is advisable to use the equipment in the place for which it is designed.

DETERMINE BEARING TIGHTNESS BY AMOUNT OF RESISTANCE AT STARTING MARK

Q—How can a person determine when a Ford connecting rod bearing is set too tight when the piston is in the engine?

1—If the engine is being worked on at the time you wish to test the connecting rod bearings it can be done very easily. Loosen all connecting rod bearings except the one which you wish to test for tightness. The bearing on one cylinder is too tight if the engine cannot be spun by hand. With one connecting rod properly fitted a person should be able to spin the engine with the left arm without any great exertion. It is absolutely necessary that the other bearings be loose at the time because the resistance of the crank will not give the true tightness of the one bearing unless all other bearings are loose. Most Ford service stations fit the Ford bearings comparatively tight nevertheless when all Ford connecting rod bearings are fully drawn up the engine should be limber enough that it could be turned over by hand with all connecting rods tightened. It may be so stiff however that it will be impossible to spin the engine.

2—I understand that the connecting rod bearings should have .002 inch clearance. How is it possible to measure such clearance? What instrument is used?

2—The Ford connecting rods are not fitted with .002 clearance although connecting rods used in an engine where force feed lubrication is employed should have approximately .002 clearance. There are two methods of measuring this clearance. One is to fit the bearing to a mandrel two thousandths larger than the crank pin diameter. Another method is to secure a piece of brass or steel shim stock of the required thickness and fit the bearing with this shim stock between the crankpin and bearing bushing. The use of shim stock for gaging clearances is very thoroughly dealt with in an article in Motor Age in the May 25, 1922, issue under "Cylinder Refinishing Methods."

3—Wish to purchase adjustable reamers would you advise me to get Cleveland reamers?

3—It is contrary to the policy of this paper to recommend any particular device, however, wish to state that you may safely purchase any of the adjustable reamers which are advertised in the pages of this magazine. Cleveland reamers are recognized as being a quality product. They are used in large quantities in many machine shops and automotive service stations. There are several other makes of reamers also which are equally as good and we believe that it is worth your time to read the advertisements of all the reamer manufacturers before making a decision as to which is the most suitable reamer.

4—How many m.p.h. will the Light and Big Six Studebaker go?—V. C. Stotterberg, Manitowoc, Wis.

4—The maximum speed of the Big Six Studebaker is 60 m.p.h. The Light Six 50 m.p.h.

AN IDEAL ELECTRICAL SERVICE STATION IN THE MAKING—No. 3

Very Little Equipment Needed for Ignition Testing

MANY a repair shop doing general overhauling contains men capable of handling ignition repairs, if these men realized how simple it is to test for ignition faults. Most mechanics think that some elaborate device is necessary and that it takes a super man to operate it when obtained. This is far from being the case, for while it is highly desirable to have good testing equipment, which will not only do the work but also impress the customer, it is never the less possible to get along at first with rather simple equipment.

Few mechanics realize that the customer that brings his car to the shop also brings an ignition tester with him, at least the essential parts are there, as part of the car's electrical equipment. The car has its own battery from which current can be taken. There is already provided a switch for connecting and disconnecting the coil. An ammeter is already connected in the circuit so that the coil current can be checked, and the various parts of the ignition system are all wired up ready to test.

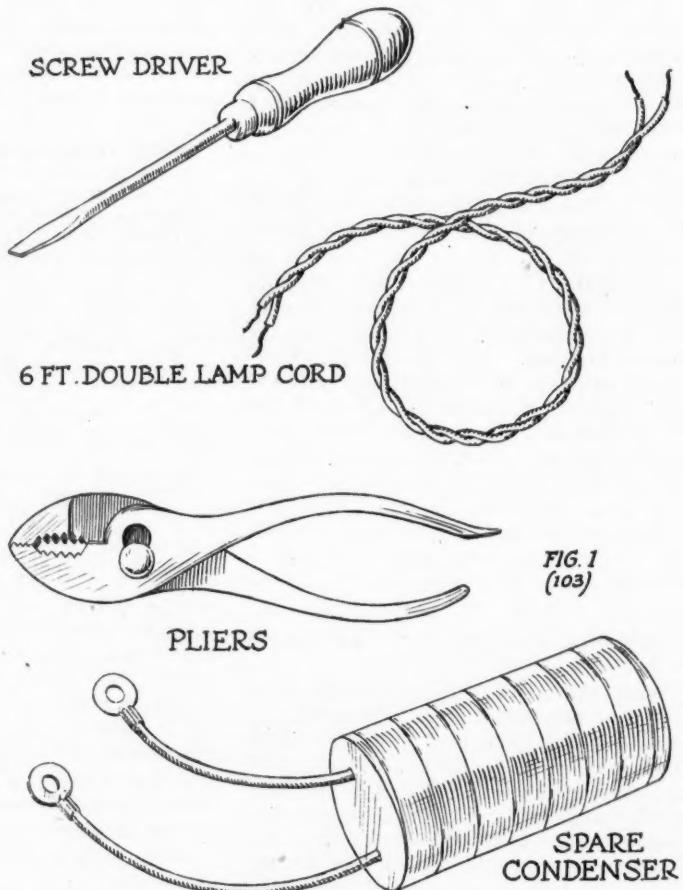
In addition to the equipment that the car owner brings without knowing it, there are a few items that the repair man can use to make a thorough test. This constitutes the "Old Timer's Ignition Test Outfit," which is made up of a screw driver, a pair of pliers, a six foot length of double lamp cord and a spare condenser taped up and with leads extending for quickly connecting to the ignition interrupter. Most any ignition condenser will do, the kind obtained from an old Ford coil being satisfactory.

The screw driver as an ignition tester has been used since cars first ran, as an easy means of testing the spark plugs to determine whether one is missing, the wood handle acting as insulation to prevent receiving a shock. Slowing down of the engine on this test indicated a good plug while no change in engine operation indicated that the cylinder was dead already. The pliers are used for all round work and the spare condenser to substitute for the regular one supplied with the ignition system.

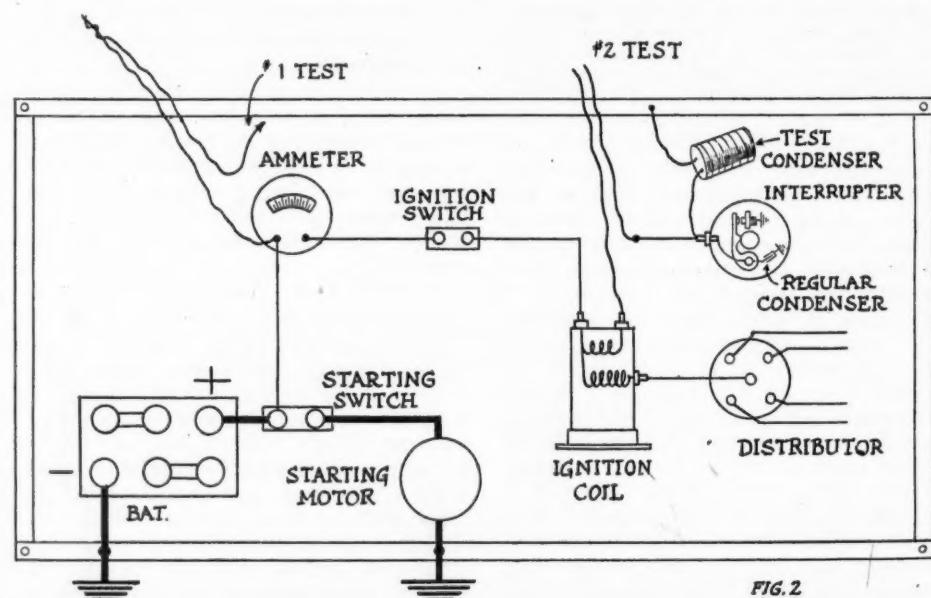
The substitution method of testing is often more reliable than any other. For example if one spring of the car sags, the Old Time Shop Man will say, "Try a new one," and of course if the new spring brings the car up to its proper level it shows the old one to be defective. In the same way the use of the test condenser in place of the one on the car, will by improved operation show the old one to be defective.

The method of using the lamp cord is shown in Fig. 2, there being two general ways of using the cord to advantage. In test No. 1, the ends of the cord are twisted together at one end, while at the other end one wire is connected to some part of the ignition circuit and the other end is flashed to the frame of the car. This test is made to locate open circuits, as flashing shows the circuit to be O. K. from the battery to the point tested, while failure to get a flash would indicate a break.

In test No. 2 the lamp cord is used to connect in to the circuit, and then bring the free ends of both wires out to the running board where connection could be made to a meter. If there should be no ammeter on the car, this method could be employed to check the current going to the ignition coil.



OLE TIMERS IGNITION TEST OUTFIT



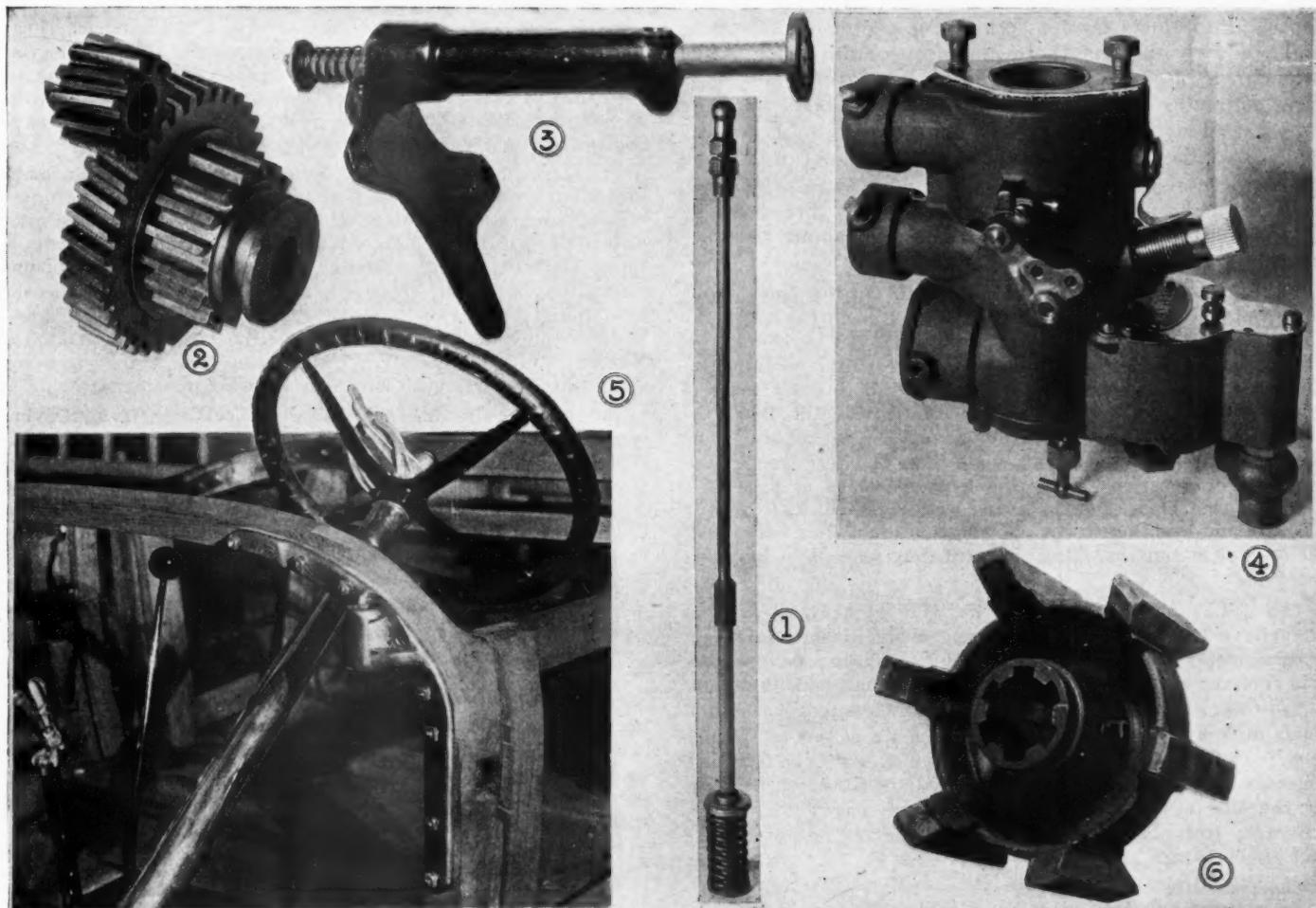
Method of testing with lamp cord and condenser

Another way to use test No. 2 is to check the condenser for punctures. In doing this the interrupter points are held open so that normally there would not be a complete circuit through the ignition coil and back to the battery on account of the points being open. Any circuit found to exist would then be due to a leak in the condenser due to its being shorted or punctured. With a voltmeter connected at test No. 2 a reading would show a defective condenser while no reading would indicate that the condenser is not shorted. After the test is completed the lamp cord would be removed and the wire from

the interrupter connected back on the coil terminal. If the condenser had shown a short it would have to be disconnected and the test condenser would be put on in its place as indicated.

Those who do not wish to use equipment obviously salvaged from coils that have been junked, and who wish to have for ignition testing, instruments that are in accord with the tone of their shop, would do well to consider the use of devices that are put on the market by reputable concerns. These not only give the tests desired but are effectual in properly selling the maintenance idea.

Close-ups of Mechanical Features in New Buick



- 1—Composite push rod, the lower part of which is aluminum and the upper steel. This construction insures the proper tappet clearance at all times.
- 2—To secure silent cranking a helical gear is used in the motor-generator gear train instead of spur gears.
- 3—A tension spring is now used on the starting switch pedal as an anti-rattle device.
- 4—The carburetor has been modified so that the dash pot is now in a position where it cannot catch dirt or water.
- 5—One of the improvements in the new Buick is the substantial tying of the body and body attachments. This shows the firm bracket for the windshield support.
- 6—The clutch hub is now a forging with ground splines instead of a malleable casting.

Peoria "Shop Profits" Meeting

PEORIA, Ill., Aug. 3—One of the largest merchandising meetings held in Illinois since the inauguration of the "Shop Profits" campaign of the Automotive Equipment Assn. was held at Jefferson Hotel here last Friday night. The speakers were E. C. O'Donnell of the Automotive Equipment Assn., Geo. Rick-

enberger of the Washington Auto Supply Co., Walter G. Hecker of the Curtiss Pneumatic Machinery Co of St. Louis and B. W. Ruarck. The meeting was presided over by A. G. Thede, president of the Peoria Automobile Dealers' Assn.

The two motion pictures of the Automotive Equipment Assn., "Ask 'Em to Buy" and "Shop Profits," were shown. At a dinner which followed the showing

of these pictures there were 552 dealers, employes and guests.

A second meeting Saturday night, attended by about 100 jobbers, was addressed by Ray W. Sherman, director of the merchandising department of the Automotive Equipment Assn., who was not able to attend Friday night's meeting. Unusual enthusiasm was shown by dealers and jobbers who attended.

"Mid-Summer Automobile Festival"

Denver's Second Annual Outdoor Show Is Popular

DENVER, Colo., Aug. 5—Denver's second annual outdoor automotive show started its three-day program last night at the city's widely famed Civic Center, with seventy-seven passenger cars, seven motorcycles, six automobile camp equipment exhibits and one special transportation bus, and with an attendance running well into the thousands.

There was no registering of visitors or any other method provided for an accurate count, and people kept coming and going throughout the evening's program, making the attendance rather difficult to judge; but careful observers gave estimates ranging from 25,000 to 35,000. That the crowd included a substantial number of motorists was shown by the fact that all the available parking space within several blocks of the Civic Center was filled with cars throughout the evening, and also by the remarks of many of the visitors asking salesmen about the cars on exhibit.

While the crowd kept almost constantly on the move, surging from one end of the block-long exhibition to the other, the exhibiting dealers were well pleased with the percentage of visitors that stopped to ask questions indicating genuine interest of the prospective buying kind. "If I don't make a single sale as a direct result of the show, I'll still figure the event well worth while from an advertising standpoint," one dealer declared. "People can come here and feel free to ask all sorts of questions, make quick comparisons of cars in a certain price class and go away well satisfied with getting practical information in far shorter time than they could visit all the salesrooms handling the cars they happen to be interested in."

This "Midsummer Automobile Festival Al Fresco," as it is officially called, is conducted on less formal lines than a regulation motor show, and some of the exhibitors believe that this free-and-easy spirit of the affair, combined with the open-air setting, displays their cars in a natural "atmosphere" and tends to do away with any restraint liable to be felt by visitors under ordinary show conditions. In fact, a few exhibitors are experimenting with the idea of a "spieler" salesman standing by the side of his car or on the running board and asking passersby to tarry long enough to take a good look at his car and remember its name.

The committee in charge of the festival consists of Henry Dawson, of the Calkins Motor Co., who has managed Denver's last two regular automotive shows and who is managing this

outdoor event; A. M. Platt, of the Platt-Fawcett Motor Co., Wallin G. Foster, of the Franklin-Denver Motor Co., O. L. Davis, manager of the Mountain Motors Co., B. E. Mead, branch manager for the J. I. Case Threshing Machine Co., J. L. Armstrong, of J. L. Armstrong, Inc., C. S. Norton, of the Norton-Buick Co., and Frank I. Carruthers, advertising manager of the Denver Post, which originated the al fresco idea last year and which is promoting the present event in co-operation with the leading dealers and distributors.

Music and vaudeville programs are given in the Greek Theatre, at one end of the exhibition grounds, and the crowds visiting the displays are entertained by unique "gypsy" singing furnished by two quartets, the Carlson Sisters and the Lee Gibbons Male Quartet. The Denver Municipal Band also gives a concert at the opening of each evening program.

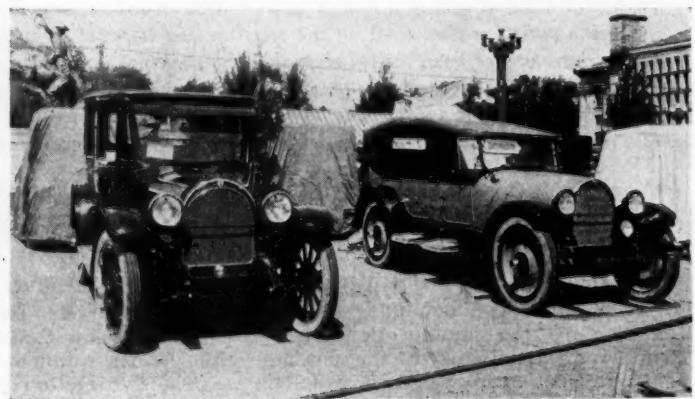
The cars shown are the Dorris, Velie, Peerless, Marmon, Stephens, Jordan, Cleveland, Buick, Franklin, Kissel, Columbia, Hudson, Essex, Oldsmobile, Durant, Stutz, Dodge, Packard, Bell, Pullman, Pierce-Arrow, Moon, Winton, Rauch & Lang Electric, Paige, Chandler, Mitchell, Chevrolet, Lincoln, Nash, Willys-Knight, Overland, Ford, Studebaker, Lexington, Reo, Detroit Electric, National, Elgin, Gardner, Cole, Rickenbacker, Anderson, Oakland, Dorr, Cadillac, Hupmobile, Haynes, Maxwell, Wills Sainte Claire, and Case. There are forty-one exhibiting dealers, most of them showing two cars each.

The motorcycles are the Indian, Excelsior, Harley-Davidson, and a Special Steamer motorcycle, the displays including sidecars. Camping equipment is shown by the Schaefer, Brooks, Denver and Colorado Tent & Awning Cos., by the Stoll Auto Bed Manufacturing Co., and the Western Auto Supply Co., while the Izett "Sleeper" is shown by the Izett Auto Body Co., and the Inter-City Auto Lines, Inc., displays one of its Fageol transportation buses being operated between Denver and other Colorado points.

Admission is free to the public, and the only cost to the exhibitors is the expense of arranging and maintaining their displays, all entertainment expenses and similar costs being borne by the newspaper promoting the event. The large opening attendance was a surprise to everybody connected with the show, because of a rain in the late afternoon and early evening, and also because of a mammoth fireworks display at Lakeside, the city's leading amusement park, in honor of Colorado Day, and several other attractions offering special holiday features. It is a common prediction among the dealers that the show will prove a substantial stimulant to summer and fall business, and that it will be a still stronger success than was the similar event staged a year ago by the Post and the Denver Automobile Dealers' Association.



General view of Denver's midsummer outdoor automobile show with Greek theatre at end of exhibit



Two of the 77 cars in Denver's midsummer show. Cars were covered with canvas over night as shown in the background

COMING MOTOR EVENTS

AUTOMOBILE SHOWS

Toronto	Canadian Nat'l Exhibition	Aug. 26-Sept. 1
Columbus, O.....	Columbus Auto Dealers Co.....	Aug. 28-Sept. 3
Decatur, Ill.....	Industrial Exhibition and Automobile Show	Aug. 30-Sept. 9
Indianapolis	Indianapolis Automobile Trade Assn..	Sept. 4-9
Wilmington, Del..	Delaware State Fair	Sept. 4-9
Hartford, Conn....	Connecticut Fair Grounds.....	Sept. 4-9
Spokane, Wash....	Annual Show	Sept. 4-9
Memphis	Memphis Automobile Dealers' Assn..	Sept. 23-30
Wash'gton, City of Closed Car Salon.....	Oct. 21-28	
Chicago	Annual Show of the Automotive Equipment Association	Nov. 13-18
New York.....	Annual Show	Jan. 6-13
Chicago	Annual Show at Coliseum N. A. C. C.....	Jan. 27-Feb. 3

CONVENTIONS

Chicago	Show Managers' Assn.....	Sept. 14-15
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FOREIGN SHOWS

Berlin	Kaiserdamm Hall	Sept. 25-Oct. 3
Rio de Janiero.....	Automotive Exhibition	Sept., 1922
London	International Commercial Vehicle Exhibition	Oct. 12-13
Paris, France	Automobile Show	Oct. 4-15
London	Annual Show	Nov. 3-11

RACES

Colo. Spgs., Colo..	Pike's Peak Race.....	Sept. 4
San Carlos, Cal....	500-Mile Armistice Day Race.....	Nov. 11

Piston Specification Booklet

A piston specification list for use when ordering replacement pistons is just off the press by the Electric Machine Corp., Indianapolis, manufacturers of a replacement iron piston marketed under the trade name of Elmco. Besides the price of each size of piston there is also printed complete specifications of each catalogued piston. The diameter of the piston pin hole, the distance between bosses, the distance from head to center of pin hole, the width and number of ring grooves and type of pin retainer, are specified in tabular form. Reference to the list enables the reader to determine pistons which are interchangeable on two or more engines.

IT'S ALL IN A SALEMAN'S LIFE

Each Fall he will buy—in the Spring;
Each Spring he must ask his wife,
And it's always the same old thing,
But it's all in a Salesman's life.

—:—
It's a cinch he will buy—afterwhile,
But his wife cannot really decide;
And all you can do is smile,
And think that somebody lied.

—:—
She likes the Coupe—what a sale,
But they figure their old car too high;
And there's always the shortage of kale.
Will the bank let his notes get by?

—:—
But her mind will be changed overnight;
She thinks that a Touring will do,
And later decides on a Light
Six Roadster—'twill answer for two.

—:—
The order is signed—you're in good
With the boss—for awhile anyhow,
But cars don't come through as they should,
The factory is over-rushed now.

—:—
It must be delivered—Today.
Faint Hope is alive in you still,
When you hear there's a load on the way,
But nothing to take up the Bill.

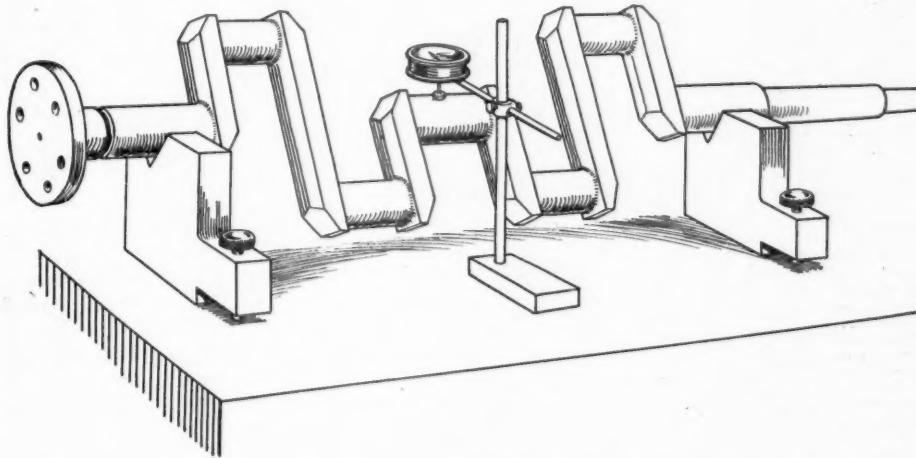
—:—
The money is borrowed—and then
You deliver to Prospect and Wife.
With each sale you must do it again
—But it's all in a Salesman's life.

By A. Nicholas, Etchen Auto Co.,
Coffeyville, Kan.

DOING ONE THING WELL

An engine which has been disassembled should never be put together again until the crankshaft has been tested for alignment. The best mechanic in the world cannot tell a sprung crankshaft by merely glancing at it. Even a new shaft just shipped from the factory may be a few thousandths of an inch off and because it is a new shaft may be assumed to be straight by the unsuspecting mechanic.

Many dealers have as yet to learn the importance of providing in their shops accurate methods for checking alignments of various engine and chassis units. Of these the facilities and methods used for crankshafts are probably the most important, because the crankshaft is virtually the backbone of the engine.



To accurately check a crankshaft a large surface plate is essential. This has a dead level surface and is the starting point for all measurements. The shaft is placed on two V-blocks being supported at each end bearing. The end bearings are checked with a micrometer for roundness and if found to be perfectly round the V-blocks are adjusted for height, so the shaft will be absolutely horizontal with the surface plate. This is checked with a dial indicator, first on one end bearing and then on the other.

The dial indicator is then moved to the center main bearing, the indicator placed against the bearing and the shaft slowly rotated.

If the shaft is sprung the needle of the dial indicator will show it in thousandths of an inch.

In the absence of a surface plate, lathe centers can be used for supporting the shaft, but this method is not quite as accurate as the V-blocks, as the live and dead centers of the lathe may not be perfectly in line.

TRACTORS FOR THRESHING

CHARLES CITY, Ia., July 31—Increased sale of tractors for threshing purposes as a direct result of the coal strike is reported by the Hart-Parr Co.

Using the information, reported in newspapers, that there is a shortage of coal for threshing engines, the sales department of Hart-Parr Co. is making a special effort to sell kerosene tractors for this purpose.

Specifications of Current Motor Truck Models

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive				
				Front	Rear						Front	Rear						Front	Rear					
Acme.	1/2-1	\$1050a	3 1/2x5	34x5n	34x5n	W	Corbitt.	D-22	1 1/2	\$2200	3 1/2x5	34x3 1/2	34x5	W	Gersix.	3 1/2	\$4500	4 1/2x6	36x5	40x12	W			
Acme.	RB	1 1/2	1950	3 1/2x5 1/4	36x5	W	Corbitt.	C-22	2	2600	4 1/2x5 1/4	36x3 1/2	36x7	W	Graham Bros.	1	1265	3 1/2x4 1/2	33x3 1/2	34x5n	B			
Acme.	H	2 1/2	2750	4 1/2x5 1/4	36x4	W	Corbitt.	B-22	2 1/2	3000	4 1/2x5 1/4	36x4	36x7	W	Graham Bros.	1 1/2	1225	3 1/2x4 1/2	33x4 1/2	36x6n	B			
Acme.	L	3 1/2	3450	1 1/2x5 1/4	36x5	W	Corbitt.	R-22	3	3200	4 1/2x5 1/4	36x4	36x8	W	Gramm-Pion.	10	1245	3 1/2x5	33x5	33x5n	B			
Acme.	M	5	4350	5 1/2x6	36x6	40x12	W	Corbitt.	A-22	3 1/2-4	3800	4 1/2x5 1/2	36x5	36x10	W	Gramm-Pion.	15	1750a	3 1/2x5	36x3 1/2	36x5k	B		
Acme.	C	1 1/2	2295	3 1/2x5 1/4	34x3 1/2	35x5	W	Corbitt.	AA-22	5	4500	1 1/2x6	36x6	40x6d	W	Gramm-Pion.	65	2250a	3 1/2x5	36x3 1/2	36x5	B		
Acme.	A	2	2795	4 1/2x5 1/4	36x4	36x7	W	Corbitt.							W	Gramm-Pion.	20	2475	4 1/2x5 1/4	36x4	36x7k	B		
Acme.	20	1	...	3 1/2x5	35x5	35x5	W	Day-Elder.	AS	1	1600	3 1/2x5	35x5n	35x5n	W	Gramm-Pion.	30	3300	4 1/2x5 1/2	36x6n	40x4k	W		
Acme.	30	1 1/2	...	3 1/2x5	34x3 1/2	34x5	W	Day-Elder.	B	1 1/2	2000	3 1/2x5	34x3 1/2	34x5	W	Gramm-Pion.	75P	3 1/2	4225a	4 1/2x5 1/2	36x6n	42x9n	W	
Acme.	40	2	...	3 1/2x5	34x3 1/2	34x5	W	Day-Elder.	D	2	2400	4 1/2x5 1/2	36x4	36x7	W	Gramm-Pion.	40	4	3850a	4 1/2x5 1/2	36x5	36x5k	W	
Acme.	60	3	...	4 1/2x5 1/2	36x4	36x7	W	Day-Elder.	F	2 1/2	2750	1 1/2x5 1/2	36x4	36x7	W	Gramm-Pion.	50	5-6	4450a	4 1/2x5	36x6	40x6k	W	
Acme.	60L	3	...	4 1/2x5 1/2	36x4	36x7k	W	Day-Elder.	F	3 1/2	3150	1 1/2x5 1/2	36x5	36x5d	W	Hahn.	B	1	1750	3 1/2x5	34x5k	34x5k	W	
Acme.	90	4 1/2	...	1 1/2x5 1/2	36x5	40x10	W	Day-Elder.	F	4 1/2	3150	1 1/2x5 1/2	36x5	36x5d	W	Hahn.	O	1 1/2	2150	3 1/2x5 1/2	36x3 1/2	36x6k	W	
Acme.	125	6 1/4	...	4 1/2x5 1/2	36x6	40x12	W	Day-Elder.	E	5	4250	1 1/2x6	36x5	40x6dk	W	Hahn.	K	2	2550	4 1/2x5 1/2	36x4k	36x7k	W	
American.	25	2 1/2	3350	4 x 6	36x5k	36x4dk	W	Deborn.	E	1	1600	3 1/2x5 1/2	35x5n	35x5n	W	Hahn.	L	3	3350	4 1/2x5 1/2	36x5k	36x8k	W	
American.	40	4	4275	4 1/2x6	36x5k	36x5dk	W	Deborn.	FX	1 1/2	2300	3 1/2x5 1/2	34x4	34x5	W	Hahn.	M	5	3850	4 1/2x5 1/2	36x5	36x10	W	
Armed.	20	1	...	3 1/2x5 1/2	34x3 1/2	34x6	W	Deborn.	F	1 1/2	2180	3 1/2x5 1/2	34x4	34x5	W	Hahn.	N	6	4250	4 1/2x5 1/2	36x4	40x12	W	
Armed.	40-B	1 1/2	...	3 1/2x5 1/2	34x3 1/2	34x6k	W	Defiance.	G	1	1695a	3 1/2x5	35x5n	35x5n	B	Hahn.	E	1 1/2	2350	4 1/2x5 1/2	34x5n	38x7n	W	
Armed.	40-C	1 1/2	...	1 1/2x5 1/2	34x3 1/2	34x6	W	Defiance.	D	1 1/2	2095a	3 1/2x5	35x5n	35x5n	B	Hahn.	B	2	3000	4 1/2x5 1/2	36x6n	36x8	W	
Armed.	HW-B	2 1/2	...	1 1/2x5 1/2	36x4	38x7k	W	Defiance.	E	2	2275a	3 1/2x5	35x5n	38x7n	B	Hahn.	F	3	4000	4 1/2x5 1/2	36x6n	40x10	W	
Armed.	HW-C	2 1/2	...	4 1/2x5 1/2	36x4k	36x7k	W	Denby.	31 1/2	1485	3 1/2x5	35x5n	35x5n	B	Hahn.	H	1 1/2	3100	3 1/2x5	34x5n	38x7n	W		
Armed.	KW-B	3 1/2	...	4 1/2x6	36x5k	36x5dk	W	Denby.	33 1/2	2145	3 1/2x5	35x5n	38x7n	B	Hahn.	I	2	2375	4 1/2x5 1/2	36x4	36x6	W		
Armed.	KW-C	3 1/2	...	4 1/2x5 1/2	36x5k	36x5dk	W	Denby.	34 2	2395	3 1/2x5	35x5n	38x7n	B	Hahn.	J	5	5100	4 1/2x5 1/2	36x5	36x5dk	W		
Atlas.	MD	1	1185	3 1/2x5	32x4 1/2	32x4 1/2n	W	Denby.	35 2 1/2-3	2795	4 1/2x5 1/2	36x4	36x7	W	Hahn.	7	5100	4 1/2x5 1/2	36x5	40x6d	C			
Atterbury.	20R	1 1/2	2475	3 1/2x5	31x3 1/2	34x5	W	Denby.	27	4	3895	1 1/2x5	36x5	36x5d	W	Harvey.	WOA	2	2650	4 1/2x5 1/2	34x4	34x7	W	
Atterbury.	TCX	2 1/2	3175	1 1/2x5 1/2	36x4	36x4d	W	Denby.	210	5	4295	1 1/2x5	36x5	40x6d	W	Harvey.	WFA	2 1/2	2650	4 1/2x5 1/2	34x4	36x7	W	
Atterbury.	22C	2 1/2	3375	4 1/2x5 1/2	36x4	36x4d	W	Dependable.	A	1 1/2	1650	3 1/2x5	34x5n	36x6n	W	Harvey.	WHA	3 1/2	3550	4 1/2x5	36x5	36x5d	I	
Atterbury.	7D	3 1/2	3075	1 1/2x5 1/2	36x5	40x5d	W	Dependable.	C	2	2350	3 1/2x5	34x5n	34x5	W	Harvey.	WLG	2	31	3550	4 1/2x5 1/2	34x5	36x5	I
Atterbury.	22D	3 1/2	4275	4 1/2x5 1/2	36x5	40x5d	W	Dependable.	D	2 1/2	2650	4 1/2x5	36x5	36x6	W	Hawkeye.	K	1 1/2	1850	3 1/2x5 1/2	36x4	36x8k	I	
Autocar.	21UH	1 1/2-2	1950	1 1/2x5 1/2	34x4	34x5k	D	Dependable.	E	3	2950	4 1/2x5	36x5	36x5	W	Hawkeye.	M	2	2650	4 1/2x5	36x4	36x8k	W	
Autocar.	21UG	2 1/2-2	2050	1 1/2x5 1/2	31x3	34x5	D	Diamond T.	O-3	1 1/2	1975	3 1/2x5	36x3 1/2	36x4n	W	Hawkeye.	N	3	2700	4 1/2x5 1/2	36x5	36x10k	W	
Autocar.	27H	2	2950	4 1/2x5	34x5	36x7	D	Diamond T.	T	1 1/2	2250	3 1/2x5	36x3 1/2	36x5	W	Hendrickson.	O	1 1/2	2200	3 1/2x5 1/2	36x4n	36x7n	W	
Autocar.	27K2	2	3075	4 1/2x5	34x5	36x7	D	Diamond T.	U	2-2 1/2	2650	1 1/2x5	36x4	36x7	W	Hendrickson.	LG	2	2690	4 1/2x5 1/2	36x4	36x7k	W	
Autocar.	26Y	5	3350	1 1/2x5 1/2	31x6	36x12	D	Diamond T.	EL	5	4325	1 1/2x5	36x6	40x6d	W	Hendrickson.	M	3	3000	4 1/2x5	36x5	36x6dk	W	
Autocar.	26-B	5	4100	1 1/2x5 1/2	31x6	36x12	D	Diamond T.	S	5	4500	1 1/2x6	36x6	40x6d	W	Hendrickson.	K	5	4000	5 x 8	36x6	40x8	W	
Available.	H1 1/2	1 1/2	2475	1 x 5	36x3 1/2	36x5	W	Diesel.	A	...	3 1/2x5	34x4 1/2	35x5	35x5	W	Huffman.	B	1 1/2-2	1795	3 1/2x5	34x3 1/2	34x6	I	
Available.	H2	2	2775	1 x 5	36x3 1/2	36x6k	W	Diesel.	B	1 1/2	3000	3 1/2x5	36x6	36x6	W	Huffman.	C	1 1/2	1695	3 1/2x5 1/2	36x3 1/2	36x6	W	
Available.	H2 1/2	2 1/2	3160	1 x 5	36x4k	36x8k	W	Doane.	21	4100b	4 1/2x5	36x5	36x7	W	Huffman.	D	2	2895	4 1/2x5 1/2	36x4	36x7	W		
Available.	H3 1/2	3 1/2	4175	1 1/2x5 1/2	36x5	40x5d	W	Doane.	31	5100	4 1/2x5	36x5	36x5d	W	Hurlbert.	A-A	1-1 1/2	1950	3 1/2x5	34x5n	34x5n	W		
Available.	H5	5	5375	5 x 6	36x6	40x12	W	Doane.	6	6000b	5 x 6	36x6	40x6d	W	Hurlbert.	B-B	2-2 1/2	2800	4 1/2x5	36x4	36x4d	W		
*Avery.	1	...	3 x 14	31x5n	34x5n	W	Dodge Brothers.	84	730	3 1/2x5	32x4 1/2	32x4n	32x4n	W	Hurlbert.	C-C	3-3 1/2	3475	4 1/2x5	36x4	36x5d	W		
Bock.	A Jr.	1 1/2	1285a	3 1/2x5	34x4 1/2	34x4 1/2n	I	Eagle.	101	1 1/2	1875	3 1/2x5	34x5	34x5	I	Indiana.	12	1 1/2-2	...	3 1/2x5	34x3 1/2	34x5k	W	
Bock.	B-30	1 1/2	1725	3 1/2x5	34x5	36x6	W	Eagle.	100-2	2	2275	3 1/2x5	34x4	34x7k	I	Indiana.	25	2 1/2-3	...	4 1/2x5	36x4	36x5k	W	
Bock.	C-40	2	1810	3 1/2x5	30x6	36x6	W	F. W. D.	B	3	4200	4 1/2x5	36x6	-36x6	B	Indiana.	35	3 1/2-4	...	4 1/2x5	36x5</			

Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive
				Front	Rear						Front	Rear						Front	Rear	
Kleiber.....BB	2	\$3600	4 ¹ / ₂ x5 ¹ / ₂	36x1k	36x7k	W	Old Hickory.....W	1	\$1775	3 ³ / ₄ x5	36x3 ¹ / ₂	36x4k	W	Service.....	37	2	4 ¹ / ₂ x5 ¹ / ₂	35x5n	38x7n	W
Kleiber.....B	2 ¹ / ₂	3950	4 ¹ / ₂ x5 ¹ / ₂	36x5k	36x8	W	Old Reliable.....A	1 ¹ / ₂	2350	4x5	34x4	36x6	W	Service.....	52	3	4 ¹ / ₂ x5 ¹ / ₂	36x4	36x8	W
Kleiber.....C	3 ¹ / ₂	4600	4 ¹ / ₂ x5 ¹ / ₂	36x5	36x5d	W	Old Reliable.....B	2 ¹ / ₂	3500	4 ¹ / ₂ x5	34x4	36x4d	W	Service.....	72	3 ¹ / ₂	4 ¹ / ₂ x5 ¹ / ₂	36x5	36x5d	W
Kleiber.....D	5	5300	5x6	36x6	40x12	W	Old Reliable.....C	3 ¹ / ₂	4250	4 ¹ / ₂ x6	36x5	36x5d	W	Service.....	77	4	4 ¹ / ₂ x6	36x5	36x5d	W
Koshler.....D	1 ¹ / ₂	2150	31x4 ¹ / ₂	34x3 ¹ / ₂	34x5	W	Old Reliable.....D	5	5000	4 ¹ / ₂ x6	36x6	40x6d	W	Service.....	102	6	4 ¹ / ₂ x6	36x6	40x6d	W
Koehler.....M	2 ¹ / ₂	3175	4 ¹ / ₂ x5 ¹ / ₂	36x4	36x7	W	Old ReliableKLM	7	6000	4 ¹ / ₂ x6	36x6	40x7d	W	Service.....	102	6	4 ¹ / ₂ x6	36x6	40x6d	W
Koehler.....MCS	2 ¹ / ₂	3275	4 ¹ / ₂ x5 ¹ / ₂	36x4	36x7	W	Oldsmobile Econ.....I	1	1095	3 ¹ / ₂ x5 ¹ / ₂	35x5n	35x5n	W	Signal.....H	1 ¹ / ₂	2450	4 ¹ / ₂ x5 ¹ / ₂	34x4	36x6	W
Koehler.....F	3 ¹ / ₂	4470	4 ¹ / ₂ x5 ¹ / ₂	36x3	36x10	W	Olympic.....A	2 ¹ / ₂	3200	4 ¹ / ₂ x5	36x4	36x8	W	Signal.....J	2 ¹ / ₂	2875	4 ¹ / ₂ x5 ¹ / ₂	34x4	36x8	W
Koehler,MT. Trac	5	3275	4 ¹ / ₂ x5 ¹ / ₂	36x4	36x7	W	Oneida.....B9	1 ¹ / ₂	2825	4x5	36x3 ¹ / ₂	36x7	W	Signal.....M	3 ¹ / ₂	3675	4 ¹ / ₂ x5 ¹ / ₂	36x5	40x5d	W
Krebs.....23	3/4	1260	33x4 ¹ / ₂	34x4 ¹ / ₂	34x4 ¹ / ₂	B	Oneida.....C9	3 ¹ / ₂	3200	4 ¹ / ₂ x5	36x4	36x8	B	Signal.....R	4	4400	4 ¹ / ₂ x6	36x6	40x6d	W
Krebs.....24	1	1565	33x4 ¹ / ₂	34x5	34x5	W	Oneida.....D9	3 ¹ / ₂	4050	4 ¹ / ₂ x5	36x5	36x10	W	Southern.....10	1	2000	3 ³ / ₄ x5	34x3 ¹ / ₂	34x4	W
Krebs.....45	1 ¹ / ₂	2125	4 ¹ / ₂ x5 ¹ / ₂	36x4	36x7	W	Oneida.....E9	5	4725	4 ¹ / ₂ x5	36x6	40x12	W	Southern.....15	1 ¹ / ₂	2590	3 ³ / ₄ x5 ¹ / ₂	36x6n	40x8	W
Krebs.....75	2 ¹ / ₂	2375	4 ¹ / ₂ x5 ¹ / ₂	36x4	36x8	W	Oshkosh.....AA	2	3250	3 ¹ / ₂ x5	36x6n	36x6n	B	*Standard.....75	1 ¹ / ₂	1330	3 ³ / ₄ x5	33x5n	33x5n	W
Krebs.....110	3 ¹ / ₂	2075	4 ¹ / ₂ x5 ¹ / ₂	36x5	40x10	W	Oshkosh.....BB	2 ¹ / ₂	3400	4 ¹ / ₂ x5	38x7n	38x7n	B	Standard.....1-K	1 ¹ / ₂	1600	3 ³ / ₄ x5	34x3 ¹ / ₂	34x5	W
Larrabee.....X-2	1	1925	31 ¹ / _{2x4¹/₂}	34x5n	34x5n	B	Oshkosh.....C	2 ¹ / ₂	3850	4 ¹ / ₂ x5	38x7n	38x7n	B	Standard.....76	2 ¹ / ₂	2400	4 ¹ / ₂ x5	36x4k	36x7k	W
Larrabee.....U	1 ¹ / ₂	2100	33x4 ¹ / ₂	34x3 ¹ / ₂	34x5	W	Oshkosh.....D	3 ¹ / ₂	450	3 ¹ / ₂ x5	30x3 ¹ / ₂	30x3 ¹ / ₂	W	Standard.....66	3 ¹ / ₂	3150	4 ¹ / ₂ x5	36x5	36x10	W
Larrabee.....J	1 ¹ / ₂	2400	33x4 ¹ / ₂	34x3 ¹ / ₂	34x5	W	*Overland.....4	5 ¹ / ₂	450	3 ¹ / ₂ x5	30x3 ¹ / ₂	30x3 ¹ / ₂	W	Standard.....5-K	5	4400	4 ¹ / ₂ x6	36x6	40x12	W
Larrabee.....K	2 ¹ / ₂	3100	4 ¹ / ₂ x5 ¹ / ₂	36x4	36x7	W	Packard.....EC	2-3	3100	4 ¹ / ₂ x5	36x4	36x7	W	*Star.....	6	610b	3 ¹ / ₂ x4	30x3 ¹ / ₂	30x3 ¹ / ₂	W
Larrabee.....L	3 ¹ / ₂	3450	4 ¹ / ₂ x5 ¹ / ₂	36x4	36x8	W	Packard.....EX	2-2 ¹ / ₂	3100	4 ¹ / ₂ x5	36x6n	40x8n	W	Sterling.....1 ¹ / ₂	2885	4 ¹ / ₂ x5	36x3 ¹ / ₂	36x5k	36x5k	W
Larrabee.....M	3	3000	4 ¹ / ₂ x5 ¹ / ₂	36x4	36x8	W	Packard.....ED	3-4 ¹ / ₂	4100	4 ¹ / ₂ x5	36x5	36x5d	W	Sterling.....2	3085	4 ¹ / ₂ x5	36x4k	36x6k	36x6k	W
Larrabee.....M-3	4	3450	4 ¹ / ₂ x5 ¹ / ₂	36x4	36x8	W	Packard.....EF	5-7 ¹ / ₂	4500	5x5	36x6	40x10d	W	Sterling.....3	3290	4 ¹ / ₂ x5	36x4k	36x4k	36x4k	W
Larrabee.....M-4	5	3450	4 ¹ / ₂ x5 ¹ / ₂	36x5	36x8	W	Paige.....52-19	1 ¹ / ₂	1950	4 ¹ / ₂ x5	34x3 ¹ / ₂	34x5	W	Sterling.....4	3425	4 ¹ / ₂ x6	36x5	40x6d	40x6d	W
Larrabee.....M-5	6	3450	4 ¹ / ₂ x5 ¹ / ₂	36x5	36x8	W	Paige.....51-15	3 ¹ / ₂	1875	3 ³ / ₄ x5	34x5n	34x5n	W	Sterling.....5-C	5500	5x6 ¹ / ₂	36x6	40x6d	40x6d	C
Maccar.....L	1 ¹ / ₂	4125	4 ¹ / ₂ x5 ¹ / ₂	36x4	36x8	W	Parker.....C-22	2-3	3145	4 ¹ / ₂ x5	36x5	36x5d	W	Sterling.....6	6000	5x6 ¹ / ₂	36x6	40x7d	40x7d	C
Maccar.....H-A	2	4125	4 ¹ / ₂ x5 ¹ / ₂	36x4	36x8d	W	Parker.....G-22	2 ¹ / ₂	3200	4 ¹ / ₂ x6	34x4	36x4d	W	Sterling.....14	1245	3 ³ / ₄ x5	34x4 ¹ / ₂	34x4 ¹ / ₂	34x4 ¹ / ₂	I
Maccar.....H-2	3	4125	4 ¹ / ₂ x5 ¹ / ₂	36x4	36x8d	W	Parker.....J-20	3 ¹ / ₂	3950	4 ¹ / ₂ x6	34x4	36x4d	W	Sterling.....15	15 ¹ / ₂	1445	35x5	35x5n	35x5n	I
Maccar.....H-3	4	4125	4 ¹ / ₂ x5 ¹ / ₂	36x4	36x8d	W	Parker.....M-20	5	4850	5x6	36x6	40x6d	W	Sterling.....7-X	2 ¹ / ₂	2190	4 ¹ / ₂ x5	34x4	34x7	I
Maccar.....M-4	5	4125	4 ¹ / ₂ x5 ¹ / ₂	36x5	36x8d	W	Patriot.....Revere	1	1383	3 ³ / ₄ x5	35x5n	35x5n	W	Sterling.....10-X	3 ¹ / ₂	2390	4 ¹ / ₂ x5	34x4	34x7	I
MacDonald.....A	7	5750	4 ¹ / ₂ x6	40x7	40x14	W	Patriot.....Lincoln	2	2050	4 ¹ / ₂ x5	34x3 ¹ / ₂	34x5	W	Sterling.....10	3 ¹ / ₂	3190	4 ¹ / ₂ x6	36x5	36x5b	W
Mack.....AB, D.R.	1 ¹ / ₂	3150	4 ¹ / ₂ x5	36x4	36x8	W	Pierce-Arrow.....F	2	3200	4 ¹ / ₂ x6	34x4	36x4d	W	*Stoughton.....C	3 ¹ / ₂	1245	4 ¹ / ₂ x5	34x4 ¹ / ₂	34x4 ¹ / ₂	W
Mack.....AB Chain	1 ¹ / ₂	3100	4 ¹ / ₂ x5	36x4	36x8d	W	Pierce-Arrow.....G	3 ¹ / ₂	3450	4 ¹ / ₂ x6	34x4	36x4d	W	Stoughton.....A	1	1790	33x5	34x5	34x5	W
Mack.....AC Chain	3 ¹ / ₂	4950	5x6	36x5	40x5d	W	Pierce-Arrow.....H	5	4850	4 ¹ / ₂ x6	36x5	40x6d	W	Stoughton.....B	2 ¹ / ₂	2150	33x5	34x5	34x5	W
Mack.....AC Chain	5	5500	5x6	36x6	40x6d	W	Pittsburgh.....2	3000	3 ³ / ₄ x6	36x4	36x4	36x4	W	Stoughton.....D	2	2490	4 ¹ / ₂ x6	36x4	36x7	W
Mack.....AC Chain	7	5750	5x6	36x6	40x12	W	Pittsburgh.....3	3800	4 ¹ / ₂ x6	36x4	36x7	36x7	W	Stoughton.....F	3	3150	4 ¹ / ₂ x6	36x5d	36x6b	W
Mack.....AC Trac.	10	5500	5x6	36x8	40x6d	W	Power.....F	2	3150	3 ³ / ₄ x6	36x5	40x10	W	Sullivan.....E	2	2800	4 ¹ / ₂ x6	36x4	36x7k	W
Mack.....AC Trac.	13	5750	5x6	36x8	40x6d	W	Promecar.....B-143	1 ¹ / ₂	2475	3 ¹ / ₂ x5	36x5	36x5d	W	Sullivan.....H	3 ¹ / ₂	3750	4 ¹ / ₂ x6	36x5	36x5d	W
Mack.....AC Trac.	15	6010	5x6	36x7	40x12	W	*Rainier.....R-29	3 ¹ / ₂	3125	3 ¹ / ₂ x5	35x5n	35x5n	W	*Thomart.....11	11	1795a	4x5 ¹ / ₂	34x5	34x5	C
*Mapleleaf.....AA	1 ¹ / ₂	3000	3 ³ / ₄ x5 ¹ / ₂	34x5n	36x6n	W	*Rainier.....R-26	1 ¹ / ₂	3345	3 ¹ / ₂ x5	34x3	34x5	W	Tiffin.....GW	1 ¹ / ₂	2100	4 ¹ / ₂ x5	36x3 ¹ / ₂	36x5	W
Menominee.....HT	1 ¹ / ₂	2000	33x4 ¹ / ₂	34x3 ¹ / ₂	36x5	W	*Rainier.....R-28	2	3200	4 ¹ / ₂ x5	34x3	34x5	W	Tiffin.....MW	2 ¹ / ₂	2700	4 ¹ / ₂			

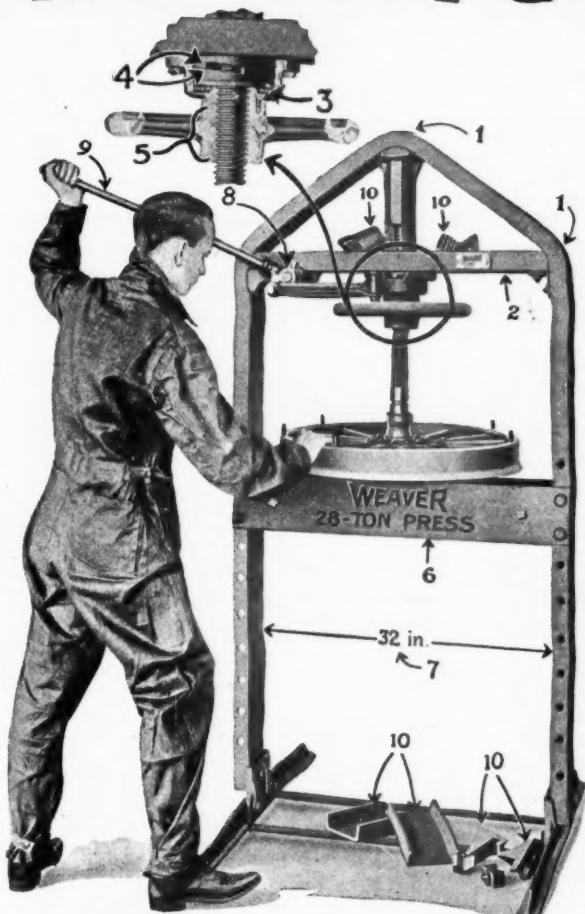
Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive	
				Front	Rear						Front	Rear						Front	Rear		
Vim.....30	1/2	\$1175	3 1/2 x 4 1/2	32x4 1/2	32x4 1/2	W	White.....40	3 1/2	\$1200	3 1/2 x 5 1/2	36x5	40x5d	D	Wichita.....O	4	\$3500	4 1/2 x 6 1/2	36x5k	36x5k	W	
Vim.....31	1	1975	3 1/2 x 5 1/2	35x5	35x5	W	White.....45	5	4500	1 1/2 x 5 1/2	36x6	40x6d	BB	Wilcox.....AA	1	1900	3 1/2 x 5 1/2	36x4k	36x4k	W	
Vim.....22	2	3150	3 1/2 x 5 1/2	36x4	36x6	W	White Hick.....E	1	1225	3 1/2 x 5	31x5	31x5	W	Wilcox.....BB	1 1/2	2550	4 1/2 x 5	36x4	36x5	W	
Vim.....23	3	3950	4 1/2 x 5 1/2	36x5	36x5d	W	White Hick.....H	1 1/2	1375	3 1/2 x 5	36x5	36x5	W	Wilcox.....D	2 1/2	3000	4 1/2 x 5	36x4k	36x3 1/2k	W	
Walker-Johnson A	2	2250	3 1/2 x 5	34x3 1/2	34x6	W	White Hick.....K	2 1/2	1675	1 1/2 x 5 1/2	36x4	36x5	W	Wilcox.....E	3 1/2	3050	4 1/2 x 5	36x5k	36x5k	W	
Walker-Johnson A	3	2750	4 1/2 x 5 1/2	36x4	36x8	W	Wichita.....K	2	1875	1 1/2 x 5 1/2	36x3 1/2	36x4k	W	Wilcox.....F	5	4350	4 1/2 x 6 1/2	36x5	40x6d	W	
Walter.....M	2 1/2	3550	4 1/2 x 5 1/2	36x4	36x8	D	Wichita.....M	1	2400	3 1/2 x 5 1/2	36x3 1/2	36x6k	W	Wilson.....F	1 1/2	2270	3 1/2 x 5	36x3 1/2	36x5	W	
Walter.....S	5	4850	4 1/2 x 6 1/2	36x6	40x6d	W	Wichita.....RX	3	3200	1 1/2 x 5 1/2	36x4k	36x5k	W	Wilson.....EA	2 1/2	2825	4 1/2 x 5 1/2	36x5	36x7	W	
*Watson.....C	1	1465a	3 1/2 x 5 1/2	35x5k	35x5k	W	Wichita.....G	3 1/2	3285	4 1/2 x 5 1/2	36x5	36x5	W	Wilson.....H	5	4520	4 1/2 x 6	36x6	40x6	W	
Watson.....N	3 1/2	4250	4 1/2 x 5 1/2	36x5	36x10	W	FINAL DRIVE:—B—Bevel, C—Chain, D—Double Reduction, I—Internal Gear, W—Worm. r—8 cyl., s—6 cyl., t—2 cyl.—all others are 4 cyl. d—dual tires, k—pneumatic tires optional at extra cost. n—pneumatic tires. a—price includes several items of equipment. b—price includes body. *—express truck or delivery wagon. **—Canadian Make. trac—tractor.	W	Wisconsin.....A	1	1750	3 1/2 x 5	34x5n	34x5n	W	Wisconsin.....B	1 1/2	2100	3 1/2 x 5	36x6	W
Western.....W1	1 1/2	2550	4 1/2 x 5 1/2	36x3 1/2	36x5k	W	Wisconsin.....C	2 1/2	2700	4 x 5	36x6n	36x7	W	Wisconsin.....D	3 1/2	3000	4 1/2 x 5 1/2	36x6n	40x8	W	
Western.....L1	1 1/2	2550	3 1/2 x 5	36x3 1/2	36x5k	W	Wisconsin.....E	5	3500	4 1/2 x 6 1/2	36x6	36x10	W	Wisconsin.....F	7	4000	5 x 6	36x6	36x12	W	
Western.....W2	2 1/2	3250	4 1/2 x 5 1/2	36x4	36x7	W	Witt-Will.....N	1 1/2	2450	3 1/2 x 5	36x3 1/2k	36x5k	W	Witt-Will.....P	2 1/2	2900	4 1/2 x 5 1/2	36x3 1/2k	36x7k	W	
Western.....W3	3 1/2	4250	4 1/2 x 6 1/2	36x5	40x6d	W															
*White.....15	3 1/2	2400	3 1/2 x 5 1/2	34x5n	34x5n	B															
White.....20	2	3250	3 1/2 x 5 1/2	36x4k	36x7k	D															

Specifications of Current Farm Tractor Models

TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Flow Capacity	TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Flow Capacity	TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	
Allis-Chalmers G.P	6-12	\$250	2	Le.R.	4-3 1/2 x 4 1/2	Gas.	1	Fordson.....	-18	\$395	4	Own	4-4x5	G, K	2	Oldsmar GarK	2 1/2-5	\$225	4	Own	1-5 1/2 x 5 1/2	Gas.	1
Allis-Chalmers	15-25	1185	4	Midw.	4-4 1/2 x 5 1/2	Gas.	3	Franklin.....G	18-30	4000	*2	Clim.	4-5 x 6 1/2	G or K	3-4	Peoria.....L	12-25	1600	4	Own	4-5 x 6 1/2	G, K	4
Allis-Chalmers	20-35	1885	4	Own	4-4 1/2 x 6 1/2	GorK	3-4	Franklin.....C	18-30	3350	*2	Clim.	4-5 x 6 1/2	G or K	3-4	Pioneer.....G	18-36	1750	4	Own	4-5 1/2 x 6	G, K, D	4
Allis-Chalmers	20-35	2085	4	Own	4-4 1/2 x 6 1/2	G	4	Franklin.....G2	18-30	4350	2	Clim.	4-5 x 6 1/2	G or K	3-4	Pioneer.....C	40-75	3550	4	Own	4-7 x 8	Gas.	10
Allis-Chalmers	20-35	2085	4	Own	4-4 1/2 x 6 1/2	G	4	Frick.....A	12-20	4	Erd.	4-4 x 6	G, K	2-3	Plowman.....A	15-30	1295	4	Buda	4-4 1/2 x 6	G, K	3-4	
Allis-Chalmers	20-35	2085	4	Own	4-4 1/2 x 6 1/2	G	4	Frick.....C	15-28	4	Beav.	4-4 1/2 x 6	G, K	3-4	Reliable.....	10-20	300	4	Own	2-6 x 7	Ker.	2	
Allis-Chalmers	20-35	2085	4	Own	4-4 1/2 x 6 1/2	G	4	Grain Belt.....A	18-36	2150	4	Wauk.	4-4 1/2 x 6 1/2	G or K	4	Rex.....	12-25	1600	4	Wauk.	4-4 1/2 x 5 1/2	G or K	3
Allis-Chalmers	20-35	2085	4	Own	4-4 1/2 x 6 1/2	G	4	Grain Belt.....B	20-36	1975	3	Wauk.	4-4 1/2 x 6 1/2	Gaa.	4-5	Russell.....D	12-24	1500	4	Own	4-4 1/2 x 5 1/2	G or K	2-3
Allis-Chalmers	20-35	2085	4	Own	4-4 1/2 x 6 1/2	G	4	Grain Belt.....C	22-44	2165	3	Wauk.	4-4 1/2 x 6 1/2	Gaa.	4-5	Russell.....E	15-30	2200	4	Own	4-5 x 6 1/2	G or K	3-4
Allis-Chalmers	20-35	2085	4	Own	4-4 1/2 x 6 1/2	G	4	Grain Belt.....D	20-30	1950	4	Beav.	4-4 1/2 x 6	G	3-4	Russell.....F	20-35	3000	4	Own	4-5 1/2 x 7	G or K	4-5
Allis-Chalmers	20-35	2085	4	Own	4-4 1/2 x 6 1/2	G	4	Grain Belt.....E	20-30	1950	4	Midw.	4-4 1/2 x 6	G	3-4	Russell.....G	30-60	6000	4	Own	4-8 x 10	G or K	8-10
Allis-Chalmers	20-35	2085	4	Own	4-4 1/2 x 6 1/2	G	4	Grain Belt.....F	20-30	1950	4	Midw.	4-4 1/2 x 6	G	3-4	Tioga.....M	18-32	445	4	Own	4-4 x 5 1/2	G, K	2
Allis-Chalmers	20-35	2085	4	Own	4-4 1/2 x 6 1/2	G	4	Grain Belt.....G	20-30	1950	4	Midw.	4-4 1/2 x 6	G	3-4	Sandusky.....J	10-20	1250	4	Own	4-4 1/2 x 5 1/2	G, K, D	2
Allis-Chalmers	20-35	2085	4	Own	4-4 1/2 x 6 1/2	G	4	Grain Belt.....H	20-30	1950	4	Midw.	4-4 1/2 x 6	G	3-4	Sandusky.....E	15-35	1750	4	Own	4-5 x 6 1/2	G, K, D	4
Allis-Chalmers	20-35	2085	4	Own	4-4 1/2 x 6 1/2	G	4	Heider.....D	9-16	1695	4	Own	6 1/2 x 7	K, D	2	Shelby.....D	15-20	1350	2	Own	4-7 x 8	Ker.	3-4
Allis-Chalmers	20-35	2085	4	Own	4-4 1/2 x 6 1/2	G	4	Heider.....C	12-20	995	4	Wauk.	4-4 1/2 x 5 1/2	G, K	3	Shelby.....C	9-18	1080	4	Own	4-5 x 6 1/2	G, K, D	3-4
Allis-Chalmers	20-35	2085	4	Own	4-4 1/2 x 6 1/2	G	4	Heider.....B	12-20	995	4	Wauk.	4-4 1/2 x 5 1/2	G, K	3	Steady Pull.....	12-24	1485	4	Own	4-4 x 5	Gas.	3
Allis-Chalmers	20-35	2085	4	Own	4-4 1/2 x 6 1/2	G	4	Heider.....A	12-20	995	4	Wauk.	4-4 1/2 x 5 1/2	G, K	3	Tioga.....J	18-32	445	4	Wauk.	4-4 1/2 x 5 1/2	G, K	2-3
Allis-Chalmers	20-35	2085	4	Own	4-4 1/2 x 6 1/2	G	4	Heider.....B	12-20	995	4	Midw.	4-4 1/2 x 5 1/2	G, K	3	Toro Cultivator	6	750	3	Le.R.	4-3 1/2 x 4 1/2	G, K, D	2
Allis-Chalmers	20-35	2085	4	Own	4-4 1/2 x 6 1/2	G	4	Heider.....C	12-20	995	4	Midw.	4-4 1/2 x 5 1/2	G, K	3	Toro Tractor	6-10	495	3	Le.R.	4-3 1/2 x 4 1/2	G, K, D	2
Allis-Chalmers	20-35	2085	4	Own	4-4 1/2 x 6 1/2	G	4	Heider.....D	12-20	995	4	Midw.	4-4 1/2 x 5 1/2	G, K	3	Townsend.....	10-20	800	2	Own	4-6 x 7	Ker.	2-3
Allis-Chalmers	20-35	2085	4	Own	4-4 1/2 x 6 1/2	G	4	Heider.....E	12-20	995	4	Midw.	4-4 1/2 x 5 1/2	G, K	3	Townsend.....	15-30	1350	2	Own	4-7 x 8	Ker.	3-4
Allis-Chalmers	20-35	2085	4	Own	4-4 1/2 x 6 1/2	G	4	Heider.....F	12-20	995	4	Midw.	4-4 1/2 x 5 1/2	G, K, D	3	Townsend.....	25-50	2500	2	Own	4-8 x 10	Ker.	4-5
Allis-Chalmers	20-35	2085	4	Own	4-4 1/2 x 6 1/2	G	4	Heider.....G	12-20	995	4	Midw.	4-4 1/2 x 5 1/2	G, K, D	3	Traction Motor	40-50	400	4	Le.R.	4-3 1/2 x 4 1/2	G, K, D	4
Allis-Chalmers	20-35	2085	4	Own	4-4 1/2 x 6 1/2	G	4	Heider.....H	12-20	995	4	Midw.	4-4 1/2 x 5 1/2	G, K	3	Traylor.....TB	6-12	500	4	Le.R.	4-3 1/2 x 4 1/2	G, K, D	4
Allis-Chalmers	20-35	2085	4	Own	4-4 1/2 x 6 1/2	G	4	Heider.....I	12-20	995	4	Midw.	4-4 1/2 x 5 1/2	G, K	3	Traulander.....	10	3750	2	Wauk.	4-5 x 6 1/2	G, K, D	4
Allis-Chalmers	20-35	2085	4	Own	4-4 1/2 x 6 1/2	G	4	Heider.....J	12-20	995	4	Midw.	4-4 1										

Increase the efficiency of your shop with this WEAVER Forcing Press



1. One piece steel frame, no bolted joints to develop weakness.
2. Top reinforced by rigid truss brace construction to prevent springing.
3. Weight of wheel and screw carried on heavy ball bearings, enabling screw to be spun up or down very quickly.
4. When developing pressure these two cam-faced washers tend to climb against each other. One reverse stroke of lever reverses their action, relieves pressure instantly, permits screw to be spun up quickly by hand wheel.
5. Extra long bearing of hand wheel on screw (over 4 1/2 in.) gives added strength at this vital point.

6. Bolster can be set in any position on frame so work is always in direct contact with screw.
7. Unusual width of frame, 32 inches, extends entire height of frame, giving an unobstructed space of 32 x 40 inches.
8. Two leverages---1,500 to 1 with lever in lower notch; 3,000 to 1 with lever in upper notch.
9. Vertical operation of lever makes it unnecessary to bolt Press to floor. Press can be turned on its side and operated horizontally or moved about shop.
10. Two pressure blocks, two vice blocks, two sections 6 inch channel steel furnished.

Other Weaver money savers are described in our catalog. Write for it now.

WEAVER MFG. CO.
Springfield Illinois U.S.A.
Canadian Factory, Chatham Ontario.



The Well-Equipped Shop Gets the Business

IF YOU asked ten repair men which piece of equipment was most useful in the repair shop---which earned the biggest dividends on the investment---nine would say a press.

In the every-day run of work in your shop there are countless times when a press can do the work far quicker, better and more economically---if it is the right press.

It was only after a very careful and exhaustive study of the requirements of the average garage that we perfected the present design of the Weaver Forcing Press. It is, we believe, the most nearly 100% efficient press for automobile repair work on the market. And after you have examined the special features of this Press mentioned below, most of which are exclusive, we feel sure you will agree with us.

The sooner you put a Weaver Press to work for you, the sooner it will pay for itself. Why not start now?

*Why you should be
sure the Press
you buy is a
Weaver*

If You Need an Extra Wide Press

We can supply a Press of the same general design as described on the left, but with a width of 42 inches between uprights, at a nominal additional cost.



Specifications of Current Passenger Car Models

NAME AND MODEL	En-gine Make	Cylinders, Bore and Stroke	WB	Tires	2-Pass.	5-Pass.	7-Pass.	Coupe	Sedan	NAME AND MODEL	En-gine Make	Cylinders, Bore and Stroke	WB	Tires	2-Pass.	5-Pass.	7-Pass.	Coupe	Sedan		
Ace.....	F-G-B.	4-3½x5	114	32x4	\$1295	\$1295	...	...	\$2295	Lincoln.....	Own.	8-3½x5	130	33x5	...	...	...	\$3900	...	
Ace.....	L-H-S	6-3½x5	117	32x4	2260	2260	...	...	3680	Lincoln.....	Own.	8-3½x5	136	33x5	\$3800	\$3800	...	\$4900	...	
Ace.....	C. Cont.	6-3½x5½	123	33x4½	2975	2975	...	...	4500	Locomobile.....	48	Own.	6-4½x5½	142	35x5	b7600	7600	10500	11000	
Ambassador.....	R. Cont.	6-3½x5½	136	33x5	b1500	\$1500	...	...	6500	Maibehm.....	B	Own.	6-3½x4½	116	32x4	1305	1305	b1495	2165	
American.....	C. I-S.	6-3½x5	127	33x4½	b1995	1850	1925	...	2695	Marmon.....	34	Own.	6-3½x5½	136	32x4½	3385	b315	3185	4385		
Anderson.....	Series 40	6-3½x4½	120	33x4	2195	1650	1705	\$2450	2530	Maxwell.....	...	Own.	4-3½x4½	109	31x4	885	885	1385	1485		
Apperson.....	8-21-S	6-3½x5	130	34x4½	...	2620	2645	3625	3695	McFarlan.....	1922	Own.	6-4½x5	140	33x5	6300	6300	7500	7500		
Auburn.....	6-51	6-3½x4½	121	32x4	1575	1615	2275	2395	...	Mercer.....	Series 5	Own.	4-3½x5½	132	32x4½	3950	b3950	4850	5250		
Auburn.....	6-51	6-3½x4½	121	32x4½	...	n2195	...	...	...	Merit.....	Cont.	6-3½x4½	121	32x4	1895	1895	...	...	
Bay State.....	Cont.	6-3½x4½	121	32x4	1800	1800	...	2400	2500	Mitchell.....	F-50	Own.	6-3½x5	120	33x5	a1490	1490	b1600	2050		
Bell.....	4-32	6-3½x5	114	31x4	1095	1095	...	...	...	Mitchell.....	F-50	...	6-3½x5	127	32x4½	...	1690	...	...
Bell.....	6-50	6-3½x5	124	32x4	1545	1545	...	...	...	Monroe.....	1922-S-9	Own.	4-3½x4½	115	32x3½	950	950	...	...
Biddle.....	Bl & B5	Buda.....	...	2930	b2950	...	3950	3950	...	Moon.....	6-40	Cont.	6-3½x4½	115	31x4	1295	...	...	1695	
Brewster.....	94	4-4x5½	125	32x4½	5000	5000	...	700	...	Moon.....	6-58	Cont.	6-3½x4½	118	33x3½	1785	2285	2785	2785		
Buick.....	1922-34-5-6-7-38	Own.	4-3½x4½	109	31x4	865	885	u725	1175	1395	...	...	...	...	...	...	...	...
Buick.....	1922-41-4-5-47	Own.	6-3½x4½	118	33x4½	1175	1195	u975	1935	1935	Nash.....	691-96-97	Own.	6-3½x5	121	33x4	1210	1240	b1395n	...	
Buick.....	1922-48-9-50-4-55	Own.	6-3½x4½	124	34x4½	n1625y	n1675y	1435	1895	2195	Nash.....	692-94-95	Own.	6-3½x5	127	33x4½	1390	1390	b1890	2190	
Cadillac.....	61	Own.	8-3½x5½	132	33x5	3100	3150	3150	b3875	4100	Nash Four.....	41-4	Own.	4-3½x5	112	33x4	915	935	...	...
Case.....	X. Cont.	6-3½x4½	122	32x4½	1750	1790	...	2550	2610	National.....	BB	Own.	6-3½x5½	130	32x4½	a2475	b2475	2375	b3725		
Case.....	W. Cont.	6-3½x5½	120	34x4½	...	2200	2250	2350	2350	Noma.....	3C	Cont.	6-3½x4½	128	32x4½	2000	b2100	c2200	...		
Chalmers.....	1922	Own.	6-3½x4½	117	32x4	1345	1395	1495	1995	2295	Noma.....	1D	Own.	6-3½x5½	128	32x4½	3000	b3100	c3200	5500	
Chalmers.....	1922	Own.	6-3½x4½	122	32x4	...	1495	...	...	Norwalk.....	430-KS	Lyc.	4-3½x5	116	32x3½	...	1035	...	...
Chandler.....	Six	Own.	6-3½x5	123	31x4	1495	b1495	1045	b1995	2295	...	...	...	...	...	...	...	...
Chevrolet.....	Superior	Own.	4-3½x4	102	30x3½	510	525	u425	5840	880	...	...	...	...	...	...	...	...
Chevrolet.....	FB	Own.	4-3½x5½	110	32x4	865	885	1325	1395	...	Oakland.....	6-44	Own.	6-2½x4½	115	32x4	975	{995	b1165n	b1445	1545
Cleveland.....	41	Own.	6-3½x4½	112	32x4	1085	1095	n1260	1495	1555	Ogren.....	6 T D Luxe	Cont.	6-3½x5½	134	33x5	b3750	3750	3850	4500	4800
Cole.....	890	Nort.	6-3½x4½	127½	33x5	2655	b2685n	2685	b3385	3685	Oldsmobile.....	43-A	Own.	4-3½x5½	115	32x4	1145	b1265	1645	1705	
Columbia.....	DeLuxe	Cont.	6-3½x5½	115	32x4	1475	b1475n	b1925	1995	...	Oldsmobile.....	46	Own.	8-2½x4½	122	33x4½	...	b1735	1735	2635	
Columbia.....	Light Six	Cont.	6-3½x4½	115	31x4	995	985	...	1395	...	Oldsmobile.....	47	Own.	8-2½x4½	115	32x4	1595	b1595	2145	2205	
Comet.....	C-53	Cont.	6-3½x5½	125	33x4½	1985	2085	...	2935	...	Overland.....	...	Own.	4-3½x4	100	30x3½	550	550	...	850	893
Crawford.....	22-6-69	...	6-3½x5½	122	32x4	3000	3000	...	4500	...	Packard.....	Single-Six	Own.	6-3½x5	126	33x4½	2485	2485	u2250	3175	3275
Crawford-Dagmar.....	6-60	Cont.	6-3½x5½	135	33x5	...	...	n3500	...	...	Packard.....	Single-Six	Own.	6-3½x5	133	33x4½	u2350	2685	...	3525
Daniels.....	D-19	Own.	8-3½x5½	132	33x5	a4350	b4350	4350	5250	6000	Packard.....	Twin-Six	Own.	12-3 x 5	136	35x5	3850	3850	5240	5400	
Davis.....	71	Cont.	6-3½x4½	114	31x4	1295	1295	1095	1195	...	Paige.....	6-44	Cont.	6-3½x5	119	32x4	1465	b1290	1995	2245	
Davis.....	61-67	Cont.	6-3½x4½	120	32x4	1595	1595	b1695	2095	2195	Paige.....	6-66	Cont.	6-3½x5	131	33x4½	a2495	b2495	2195	3100	
Dixie Flyer.....	H-S-70	I-S.	4-3½x5	112	32x4	1175	1175	b1295	1545	1595	Paterson.....	22-6-52	Cont.	6-3½x4½	120	32x4½	...	1550	1585	2595	
Dodge Brothers.....	...	Own.	4-3½x4½	114	32x4	850	880	...	1280	1440	Pearl.....	56-S-7	Own.	8-3½x5	125	34x4½	b2790	2790	3500	3700	
Doris.....	6-89	Own.	6-4	153	33x5	...	...	...	...	Pierce-Arrow.....	...	Own.	6-4 x 5½	138	33x5	5250	b5250	5250	6800	
Dort.....	19-14	D-Ly.	4-3½x5	108	31x4	885	885	...	1085	1155	Pilot.....	6-50	H-S.	120	32x4½	2050	2000	2050	2950		
Driggs.....	...	Own.	4-2½x5½	104	30x3½	1275	1275	...	1975	...	Premier.....	6-U	Own.	6-3½x5½	126	33x5	3150	b3100	3250	4300	
Duesenberg.....	Straight 8	Own.	8-2½x5	134	33x5	5500	6500	6750	7800	7800	Premocar.....	6-40-A	Falls.	6-3½x4½	117	32x4	1095	...	1750	1825	
Du Pont.....	...	Own.	4-3½x5½	124	32x4½	3000	3200	...	3800	4000	R & V Knight.....	R	Own.	4-3½x5	116	32x4	1665	1665	2385	2475	
Durant.....	A-22	Cont.	4-3½x4½	106	31x4	n890	890	...	1305	1365	R & V Knight.....	J	Own.	6-3½x4½	127	32x4½	2475	2475	3015	3105	
Durant.....	B-22	Aust.	6-3½x4½	123½	32x4½	1600	1650	...	2250	2400	Ree Series.....	T6 & U6	Own.	6-3½x5	120	33x4	1595	1595	2355	2435	
Earl.....	40	Own.	4-3½x5½	112	32x4	1485	1095	950	b1305	1705	Revere.....	C	Dues.	4-4½x6	131	32x4	3200	3200	3200	4000	
Elcar.....	K-4	Lyc.	4-3½x5	118	33x4	1095	1095	1095	1345	...	Rickenbacker.....	A	Own.	6-3½x4½	117	32x4	1485	1485	1885	1985	
Elcar.....	7-R	Cont.	6-3½x4½	118	33x4	1395	1395	2095	2095	2165	Roamer.....	6-54-E	Cont.	6-3½x5½	128	32x4½	2850	b2850	3860	3850	
Elgin.....	K-1	Falls.	6-3½x4½	118	33x4	1345	1295	b1345	2195	2195	Roamer.....	6-75-E	Dues.	4-4½x6	128	32x4½	3085	b3085	b3750n	...	
Essex.....	Own.	4-3½x5	108½	32x4	...	1095	...	1195	1295k	...	Rolls-Royce.....	Own.	6-4½x4½	143½	33x3½	...	10,900	...	...
Ford.....	T	Own.	4-3½x4	100	30x3½	r319	s348	u285	580	645	Saxon.....	125	Own.	4-3½x5	112	32x4	1195	1195	1705	1705	
Franklin.....	9-B	Own.	6-3½x4	115	32x4	1900	1950	2750	2850	...	Sayers Six.....	DP	Cont.	6-3½x4½	118	33x4	1645	1645	2645	2645	
Gardner.....	T-R & G	Lyc.	4-3½x5	112	32x4	895	895	...	1095k	1505	Seneca.....	L-2 & O	...	4-3½x5	108	30x3½	875	875	...	...
Grant.....	Own.	6-3½x4½	116	32x4	1385	1385	...	1805	1945	Seneca.....	50 & 51	Lyc.	4-3½x5	112	31x4	1095	1095	...	...
Gray.....	Own.	4-3½x4½	100	30x3½	...	490	...	...	700	...	Sperling.....	A Supr.	...	4-3½x5	114	32x4	980	980	1685	1685
IL.C.S.....	Series 3	Weid.	4-3½x5½	120	32x4½	2400	2400	...	2850	3150	Standard.....	98	Own.	8-3½x5	127	34x4½	2150	b2500	2500	2750	
Halladay.....	4	Own.	6-3½x5	115	32x4	1095	1095	1095	1990	2085	Stanley.....	2-4	...	2-4	130	32x4½	2700	2700	3775	3950	
Halladay.....	6	Own.	6-3½x5	115	32x4	1595	1595	...	2295	2395	Stanwood Six.....	Cont.	...	0-3½x							